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**THE IMPACT OF MINIMUM WAGES
ON THE YOUTH LABOUR MARKET**

**AN INTERNATIONAL LITERATURE REVIEW
FOR THE LOW PAY COMMISSION**

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INTRODUCTION

This report to the Low Pay Commission (LPC) provides an international review of the literature relating to minimum wages and the youth labour market. It covers literature on 12 countries – the USA, Australia, New Zealand, Canada, France, Belgium, Spain, the Netherlands, Portugal, Greece, Finland and the UK. We had originally sought to include Japan in our review but found no way of locating external experts willing to take part. We were also told that this issue is not commonly addressed in the Japanese literature. Instead we included Portugal (not in our original list of countries agreed with the LPC), where some relevant literature was found. We also found and report on literature concerning Finland.

The literature was collected and analysed using a modified form of systematic review by a team of academics drawn from staff at the universities of Greenwich and Middlesex. In addition, country experts were recruited and used as external contributors/advisors. Systematic review is an approach to reviewing a large body of literature with a view to creating a synthesis; originally developed in medical science, it seeks to evaluate where the weight of opinion lies on how best to treat a particular medical condition. Certain aspects of the approach were adopted in our own meta-analysis. We created a review protocol for all reviewers that asked standard questions about each publication reviewed. This protocol was created by the project directors and agreed with the reviewers and the LPC. Overall, we have used a process that is transparent to other researchers, the central principle of systematic review. However, reaching a synthesis of the definitive type aimed at in the medical sciences has not been possible because of the international nature of our review and the way that different institutional arrangements affect the impact of minimum wages. Therefore we reviewed all the relevant peer-reviewed literature we could find covering the last fifteen years. We did not exclude any works falling within this definition, but in the text we indicate where we think work unreliable as a basis for policy.

Our report is structured in three main parts. First we present a brief review of the theoretical debates concerning the relationship between the youth labour market and minimum wages. Second, we discuss in detail the methodology used in reviewing

literature. The third and central chapter reviews the relevant literature for each of the 12 countries, providing in each case first a contextual section detailing the background to the minimum wage system, the particular arrangements for young workers and then the findings from the relevant articles. Complex webs of institutional arrangements surround our issue. We have therefore divided our review of countries into two main groups – those which are commonly described as liberal market economies and those that can be described as coordinated market economies (Hall and Soskice, 2000). Liberal Market Economies (LMEs) are characterised by the fact that markets play a much larger role in regulating them than in Co-ordinated Market Economies (CMEs) where the state and other institutions play a strong co-ordinating role. In our terms, this is illustrated by the tendency for minimum wages to be set by collective bargaining or a powerful tripartite body in CMEs rather than by state-led mechanisms as in LMEs. We have included the USA, Canada, Australia, New Zealand and the UK in the former category. In the latter category, we include France, Spain, Greece, Belgium, Portugal, the Netherlands and Finland.

Table 1a provides basic data relating to the youth labour market for each country. Table 1b provides overall facts and figures on the minimum wage arrangements for young people in each country. We also present as an appendix, a summary table of key literature reviewed (Table 2), showing employment elasticities where available. Dr Denise Hawkes has provided a Technical Appendix explaining the main technical approaches used to measure the impact of minimum wages on labour markets. Some readers may wish to read this before reading the country reports, to help them recognise particular approaches. However, we include it as an appendix since it also draws some conclusions about the approaches used.

Reviewing literature requires some evaluation of the wider framework of scholarly publication. It is important to note at the outset that Doucouliagos and Stanley (2009), in a recent rigorous meta-regression analysis of the US literature on minimum wage effects, argue that the nature of articles accepted for publication in scholarly journals shows a bias towards neo-classical findings. To quote from their abstract:

‘The minimum-wage effects literature is contaminated by publication selection bias, which we estimate to be slightly larger than the average reported minimum-wage effect. Once this publication selection is corrected, little or no evidence of a negative association between minimum wages and employment remains.’

There may also be a tendency for journals to accept papers showing positive rather than neutral results on our subjects; since many of the results reported are on the margins of statistical significance, this is also relevant to our review.

The literature from the USA concerning the employment effects of minimum wage systems upon the youth labour market is most voluminous; it therefore looms large in this report. As we discuss, this may reflect a particular interest in this issue in that country and also the size of the American academy compared to that in European countries.

EXECUTIVE SUMMARY

The literature review covers scholarly literature from twelve countries, examining the impact of minimum wages on youth employment, schooling and training. It was conducted by a sizeable team of specialist reviewers, which included country experts external who acted as advisers to the review team.

The size of employment effects from the introduction of or increases in minimum wages for young people in general are extremely small and on the margins of statistical significance in the great majority of studies surveyed. The employment elasticity for 16-17 year-olds in 2003 in Hyslop and Stillman (2007), in their New Zealand study was -0.1 to -0.2, a typical result for those studies arguing that a significant effect exists. There is some evidence that negative employment effects where they exist may disappear as the worker ages.

The impact of minimum wages upon the youth labour market is more likely to be negative where there is no separate subminimum (minima) for younger workers as for example in Spain.

There is some evidence that the very small employment impacts can be mitigated and in some cases be positive if the subminimum rate is set at the appropriate level. The prudent approach taken by the UK LPC might be seen as helpful in mitigating the effect of youth minimum wages on employment.

There is also some evidence that increases in 16-17 year old rates do have some effect on the extent of their employment as shown in several studies reviewed.

Where wide support exists in society for minimum wages, employers rarely take advantage of suspensions of minimum wages for younger workers even when given the opportunity to do so as shown in the Finnish case.

The method by which the minimum wage is set is relevant, with systems which set rates by collective bargaining less likely to experience negative employment effects.

Minimum wages for young people may also have a less negative or indeed nil impact where there are strong labour market interventions by Government to support employment for young workers.

There is only a relatively small literature on effects on schooling. In the UK and the USA, there is very little evidence that minimum wages for 16-17 year olds have exerted a negative influence on continued school participation. The legal school minimum leaving age is an important determinant of continued participation.

There are contradictory estimates of the effect of minimum wages on training, partly because effects are very small.

CHAPTER 1: THEORETICAL DEBATES

❖ **Government policies: between national competitiveness and equity**

In the developed world, governments have increasingly followed policies based on arguments about 'globalisation' and the development of an 'information economy'. Both are argued to be linked to national economic prosperity. The argument is that there is an over-arching need therefore to increase investments in education and training. This in turn, it is suggested, requires them to ensure that incentives to young people to remain in education and vocational training are sufficiently high for them to do so.

Governments in the developed world, and especially in Europe, whilst firmly embracing the 'life-long learning' concept have also in practice adopted policies that emphasise heavy initial investment in education and training. In effect, this is the German model. In this model, the emphasis is on the early stages of the life course when young people are provided with a solid general vocational training that allows them later to have only top-up or up-dating training provided by employers. Costs are borne by the state, young people and their families and employers. In recent years, the financial burden in Germany has shifted away from employers, underlining the importance put on the subject by the state.

Governments have to consider societal norms in relation to the appropriate and equitable treatment of young people. These are especially strong in relation to those young people at the lower end of the age range, who are making the transition from what is perceived as the more sheltered educational and home environments where parents have more oversight possibilities, to more exposed situations in workplaces. Therefore governments have to balance their wish for incentives to be high for young people to stay on in education and training (arguing for no or low minimum wages for young people, or for graded minimum wages for different ages) with societal wishes to protect vulnerable young people from exploitation (arguing for a minimum wage set at a higher level or simply at the adult rate).

They have also had to take into account the possible consequences of creating a specific youth minimum wage or wages for the legitimacy of their wider legislation. Creating special rates for specific age groups raises issues in relation to widespread legislation trying to prevent discrimination against employees on the grounds of their age.

It is not only the legitimacy of the governmental legislation that it is at stake, but also that of the policy of a specific rate for younger workers. Thus, if specific rates for young workers at a specific point mean that they become especially attractive to employers, then that may in turn displace older workers from these jobs. Whether in fact it does so is largely related in turn to the imputed productivity of the workers in question (generally assumed to be lower for younger workers although in reality this may not universally be the case). This also shows how the issue of special minimum wage rates for young workers cannot be separated from discussion of wider effects on the working population more generally.

Governments have a wider concern with those young people who have not succeeded in entering paid employment referred to as NEETs, 'Not in Education, Employment or Training', in the UK, but a group which is similarly of concern in Europe more widely. The prospect is of the development of a grouping that in effect 'drops out' not only of employment but also become divorced from social norms more widely. The phenomenon of the 'discouraged' unemployed who stop seeking work rather than face constant rejection is well-known to both sociologists and economists. Thus, in time they may become 'unemployable' and even a source of social discontent and reduced social cohesion. In this sense, minimum wages may provide a 'pull' factor raising their incentives to seek work, with the simultaneous advantage that it holds out the prospect of removing their demand for out of work benefits.

Thus, the position for governments has become one of balancing a number of factors that are at least in tension and on occasion in direct contradiction.

❖ **Employment effects: the arguments**

When discussing the consequences of the introduction of a minimum wage on the labour market, attention tends to focus mainly on the employment effect. In fact, for some time the available evidence has concentrated squarely on this aspect.

Neo-classical economic arguments suggest that labour markets are subject to the same dynamics as other markets, i.e. that young workers may be 'priced out' of the market by minimum wages, especially if they are set at high levels. Neumark and Wascher (2008) hypothesise that minimum wage increases disproportionately reduce employment opportunities for teenagers who have already dropped out of school, finding that they did in fact operate in this way. Yet the obvious sample bias contained in this study seems to obviate the results; school drop-outs seem unlikely to have attributes attractive to employers.

A further negative result is also envisaged by those operating within this framework. The 'pricing out' of younger workers will mean that there will likely be a replacement effect as employers will then turn to older workers. Older workers may have a number of competitive advantages. They are considered almost automatically more attractive to employers by virtue of their greater life and work experience. They may have both general personal qualities and industry-specific knowledge that will mean that they will be preferred to younger workers. They may require less training and less supervision than their younger counterparts. Their productivity may be higher as a result.

The contrary argument is that younger workers may in fact demonstrate a number of positive attributes that make them more attractive to those employers with specific requirements. The first of these fits into the strong and very widespread tendency for employers to seek increased time and task flexibility from workers. Younger workers may show more flexibility in these areas. Further, they may also have positive attributes in relation to other significant aspects of the employer's business, for example by matching customer profiles thereby enhancing customer identification with products and services. Finally, they may meet a need for employers to ensure a

steady supply of employees and later managers acculturated from an early age into the specific requirements of their business.

Looking only at employment effects provides only a partial assessment of the relationship between the minimum wage and teenage employment. Attaining a better understanding of the consequences of minimum wage legislation requires analysis from a wider perspective, and looking at other individuals whose decisions are likely to be affected by the minimum wage. The review of literature on France in this report makes similar and further points along these lines. A wider focus is particularly important when dealing with teenage workers because their employment decisions are closely related to other decisions such as education and on-the-job training.

A further argument is that there is likely to be a negative effect where specific rates are set for particular ages, as in the case of the British 16-17 year old rate. This may lead to dismissal on leaving the lower rate. Conversely, in the case of overtime and where little added value comes from an older worker, the 16-17 year olds may receive preferential overtime allocation.

❖ **Training effects**

Neoclassical theory predicts that in perfectly competitive markets a minimum wage will have a negative impact on employment and on-the-job training, as well as a negative effect on workers' earnings. Hashimoto (1982) identified two ways in which the minimum wage is likely to affect on-the-job training: given the negative effect on employment, the minimum wage will prevent workers from finding a job and from receiving any training. For those who find employment, the opportunities of receiving training decrease because the firm cannot offset training costs by offering a lower wage. This issue becomes more worrying in the light of recent research showing that unskilled workers are less likely than skilled employees to receive training during their working life (O'Mahony and Peng 2010). This can have negative long term effects on productivity and innovation.

The fixing of a minimum wage floor for young workers may have an effect on employers' preparedness to train them. The neo-classical argument is again simply

based on total costs: if wage costs are raised, then employers will seek to reduce costs in other areas. This in turn, it has been suggested, may have longer-term consequences for these workers' human capital in that it may reduce their capacity to benefit from training later in their working life (see for example the various works by Neumark and Wascher reviewed below).

Contrary arguments have been put by those who argue that neo-classical assumptions about labour markets as perfectly competitive are inappropriate. Minimum wages may therefore actually increase the amount of training of all types that employers are prepared to undertake, including general training. Where labour has a specified minimum cost, this may raise employers' propensity to invest in them, since turnover may be reduced because labour is more easily retained. In short, the level of 'employer-employee interdependence' as Whitley (1999) describes it is increased. This type of effect may be greater in some industries than in others. Acemoglu and Pischke (1999, 2003) for example showed that although minimum wages had negative training effects in lower wage industries they have the opposite in higher wage industries. British evidence from Arulampalam *et al* (2004) showing that the National Minimum Wage (NMW) raised levels of training is discussed by Neumark and Wascher (2007) but dismissed on methodological grounds.

Neumark and Wascher (1998) also suggest that the negative training effects of minimum wages, which they argue exist, may stretch beyond the period in which the worker receives them. Thus, those workers who receive the minimum wage are provided with a weaker basis for later training (and we would add may become 'training discouraged'). However, low paid and low skilled workers have a low probability of receiving further training in any case. This derives from a vicious circle of their own attitudes to education more widely (as in Neumark and Wascher's sample of school drop-outs, a group which seems likely to epitomise our point) and employer attitudes to training low-skilled workers operating in symbiosis with the worker attitudes.

❖ **Participation in education effects**

An argument exists that minimum wages can pull school students out of education. Schooling decisions are particularly relevant when looking at young workers in the 15-19 age bracket and whether these young people are more likely to leave school following an increase in the minimum wage is an important question. Leighton and Mincer (1981) argued that the effect of the minimum wage on schooling can be positive if additional investment in education increases the workers' returns above the minimum wage. However, the immediate attraction of higher wages could induce young workers to leave education and enter the labour market. These decisions are naturally affected by sociological considerations such as family attitudes and individual backgrounds as well as the economic cycle. Sociological considerations are likely to be relevant here, with families more or less concerned and able to invest in education (Ehrenberg and Marcus, 1982).

CHAPTER 2: METHOD

❖ Principles and methods of the literature review

The method adopted draws on the principles of systematic review without using any version of that approach fully. Systematic review is an approach to reviewing a large body of literature with a view to creating a synthesis; originally developed in medical science, it seeks to evaluate where the weight of opinion lies on how best to treat a particular medical condition. Certain aspects of the approach were adopted in our own meta-analysis. Thus, we have used country experts to inform our literature search from its origins to the final result, an approach borrowed from systematic review. We created a review protocol for all reviewers, that asks standard questions about each publication reviewed, seeking to accord some methodologically sound works more priority in our analysis.

This protocol was created by the project directors and agreed with the LPC. For each work reviewed, a form was filled in by a reviewer and posted on a shared drive. Overall, we have used a process that is transparent to other researchers, the central principle of systematic review. However, reaching a definitive synthesis of the sort aimed at in the medical sciences has not been possible because of the international nature of our inquiry. The very different economic, national legal and institutional frameworks existing in the many countries surveyed here means that simply because of the differences between medical science and the social sciences we are unable to replicate the systematic review process entirely faithfully.

❖ Selection of works for inclusion in the review

The works for review had to be selected from a wide range of literature. All of the literature that was initially scanned is to be found in our bibliography and we hope that the inclusive bibliography to be found there, while in no way exhaustive, will be useful to other researchers. Those that were chosen to form the core of our review are posted at the following web address:

<http://www.4shared.com/account/dir/GgkmTI96/sharing.html?rnd=87> . Our starting points for identifying this literature were as follows. First, existing overviews (such as those conducted by the OECD (1998) and Neumark and Wascher, (2007 and 2008))

were trawled for their references. In addition, word searches using the terms 'young workers, young employees, youth, minimum wages, training, education, unemployment, employment' were entered into academic and business search engines. These searches were carried out in English and supplemented by searches in other languages. The latter were conducted by native speaker members of the research team for all non-English speaking countries.

Not all of the works identified were examined in detail, for several reasons. Firstly, some of them did not meet minimum standards of rigour or data quality and were therefore not included for consideration. Secondly, there is a good deal of literature of a partisan nature on this subject, given its politicisation. We did not exclude all such literature from our bibliography, but we only entered it in the bibliography when it contained original empirical investigation. Thirdly, there was also the question of the boundaries of our subject. It could be argued, and we are sympathetic to the view, that the effects of minimum wages and their levels and operation on young people are difficult to separate from their effects on all employees. Thus, for example, if young workers are encouraged into the labour market by the level of a minimum wage, then older workers may be excluded by their competition. On the other hand, our project could not attempt to scrutinise all the literature on minimum wages for all of the countries surveyed since not only was this outside of our terms of reference, it would also be a substantial task requiring a much longer time frame to complete. A pragmatic solution was therefore adopted whereby works that explicitly mentioned young workers in their titles were always included, but where these works themselves referred centrally to more general works which we considered relevant to our specific question, we read these. Finally, there were many cases in which one article could be taken as representative of a particular project from which several articles were published. We therefore sought to identify the most representative of these, to keep the project under control.

❖ **Establishment and operation of the research team**

The research team was drawn from Middlesex and Greenwich Universities' Business Schools, together with one researcher who specialises in our subject currently working as a freelance researcher for the University of Greenwich. The team

consisted of 11 academics. It was necessary to include academics with the appropriate languages to review literature not written in English, and this was done.

Their disciplinary backgrounds were in the fields of industrial relations, sociology and economics. Since many of the papers were econometric and some team members felt less competent in that area, the three econometricians in the team were referred to when team members felt that was necessary. The research team noted that the almost exclusively econometric nature of the literature was an issue, since more sociological approaches were also felt to have something to offer especially when measuring the welfare benefits of minimum wages. In this sense, the project initiated a discussion which may well bear fruit in the future in the form of new work.

The team met regularly; this allowed us to build a collective and critical approach to the reviewing process as well as facilitating information exchange and monitoring progress. The team had a central research administrator who provided an on-line project administration service to the project. As literature was identified, it was put on to the on-line database so that it could be accessed by all team members. Both these works and the reviewers' completed protocols for them were made available to all researchers both on our team and on the other teams working on related LPC projects.

The team was supplemented by external experts for most of the countries surveyed. These experts assisted the team in identifying key works at the beginning of the project, were available for consultation as it proceeded during mid 2010, and then saw and commented on the country drafts presented to them in August and September. These external experts also produced or commented on country updates for the team. We are very grateful to them.

❖ Production of interim and final reports

An interim progress report was made to LPC officers in late June 2010, immediately after a research team meeting, although the nature of the project was such that emerging findings were not then available since progress on reviewing country literature was uneven.

The building blocks of the final report were the completed protocols created by research team members. These were synthesised by both team members and the project directors. Edited versions were checked back with their creators and also with the external country experts. The results were made available to the LPC in late September 2010, and presented to the LPC non-technical workshop on October 4. Adjustments were made to the final report immediately after the workshop following feedback from the LPC and in an iterative process from October through to mid-February.

We repeat that the bibliography and the reviewers' completed protocols may be viewed at the following web address:

<http://www.4shared.com/account/dir/GgkmTI96/sharing.html?rnd=87>

CHAPTER 3: COUNTRY REVIEWS

3.1 INTRODUCTION

This chapter considers the literature reviewed for each of the countries. We have divided our review of countries into two main groups – those which broadly have been described as liberal market economies (LMEs) and those that can be considered as coordinated market economies (CMEs) (Hall and Soskice, 2000). We have included Australia, Canada, New Zealand, the UK and the USA in the former category. In the latter grouping we include Belgium, France, Greece, the Netherlands, Portugal, Spain and Finland. We recognise the complexity that underlies this simple division; Australia, for example, shows some of the features of a CME in its co-ordinated wage system. Nevertheless, we use it because the LMEs' minimum wage systems share certain characteristics, usually showing specific youth rates. Moreover, the coordinated market economies are characterised by higher levels of regulation more widely and in particular stronger regulation of redundancy, greatly impacting the effects considered here.

The country reviews require some contextualisation. In 1998, as the OECD commented in its review of the literature on minimum wages (OECD 1998), while statutory minimum wages existed in 17 OECD countries, there were substantial differences in the way they were set and operated. Twelve years later, this remains the case. The main differences between the systems in different countries concern: the level of the minimum relative to average wages; the extent of differentiation by age or region; mechanisms for indexation; and the roles of governments and the social partners in setting them. In this report we are only concerned with the second of these – the degree to which minimum wages are differentiated by age (and where relevant, by region). Because our review is limited to one feature of the impact of minimum wages – the effects on the youth labour market – there are variations in both the quantity and quality of literature considered for each country. In some cases (e.g. the UK) we found limited literature dealing directly with this issue, although reference is made to other, more general research on the impact on employment which may provide relevant evidence. The most voluminous literature on this aspect

of minimum wages impact is from the USA, and we pay especially close attention to this because of its importance as a comparator.

The OECD commented in its review that: 'It is also difficult to make direct international comparisons because of differences in the way the incidence of minimum-wage work is measured and in the groups of workers covered by the statutory minimum' (OECD 1998). It appears, however, that the lower value of the minimum wage relative to average wages in the USA than in, for example France, is also reflected in a much lower proportion of all employees paid at the minimum wage or less. In general, the incidence of minimum wage work in all countries is highest among youth, women and part-time workers. These employees also tend to be concentrated in similar industries and in smaller rather than larger employing organisations. While young workers are disproportionately affected, significant numbers of older workers are also covered.

There have been two attempts to produce cross-national comparative datasets. The OECD economists in 1998 constructed a comparative measure of the relative minimum wage by dividing the nominal minimum wage by the median earnings of full-time workers. This ratio was used in a set of regressions for seven to nine countries over the period 1975 to 1996. Using the employment-population ratio on the relative minimum wage; a business cycle control; institutional factors such as union density; the unemployment benefit replacement rate and the payroll tax rate; and fixed country and year effects; the analysis indicated overall negative and statistically significant disemployment effects for teenagers and negative and only marginally significant or insignificant effects for 20-24 year olds (OECD 1998). The estimated elasticities for teenagers ranged from -0.07 to -0.41, with the larger estimates occurring when Portugal and Spain were excluded. The OECD study included a few variables to account for institutional differences but in general the problem of comparing the impact of minimum wages across countries was seen as difficult.

Neumark and Wascher (2004) made a second attempt to compare the effects across 17 OECD countries, taking account of a variety of labour market policies and institutions. Using standard panel data for employment, including a one-year lag of

the minimum wage relative to the average wage, the regressions' 'consistently point to negative effects of the minimum wage on employment' (Neumark and Wascher 2007). When the model was augmented with controls for institutional differences, they found that the strongest evidence of a negative effect of the minimum wage upon teenage or youth employment appears only in countries without a separate youth rate. They also found evidence, although weaker, that minimum wages do not result in employment losses in countries in which minimum wages are set by some form of collective bargaining process. They also found that minimum wages had more adverse effects where labour regulation was more restrictive although, conversely, there is strong evidence that the disemployment effects of the minimum wage are more muted where employment protection is high. This also applies where there are strong proactive labour market policies to combat unemployment. Hence, institutional differences are clearly important. In a forthcoming report for the Low Pay Commission, Dolton and Bondibene (2010) also cover this research area.

In Table 1a below, we provide a summary of the different arrangements in place in different countries in relation to young people's minimum wages and the school leaving age. In general there is some variation in the age at which compulsory education ends – from as low as 14 in Portugal to 18 in Belgium and the Netherlands. The age at which the full minimum wage is paid also varies – from 16 in Canada, Portugal, Spain and Finland, to age 25 (raised in 2010 from 15) in Greece. The state of the labour markets also varies widely, reflecting the different economic circumstances in each country. Youth unemployment ranges for those aged 15 to 24 also vary from 11.6 per cent in Australia to 37.9 per cent in Spain and 36.5 per cent in the USA. In terms of participation rates in post-compulsory education, the proportion of 15 to 19 year olds in education ranges from over 90 per cent in Belgium and the Netherlands to just under 75 per cent in Australia. For 20 to 24 years olds, participation in education ranges from just 29.3 per cent in the UK to 52.1 per cent in the Netherlands. Tertiary education entry rates range from 30 per cent in Belgium to 86 per cent in Australia.

TABLE 1a YOUTH LABOUR MARKETS AND MINIMUM WAGES: KEY FACTS BY COUNTRY

	USA	Australia	New Zealand	Canada	France	Spain	Belgium	Netherlands	Portugal	Greece	UK	Finland
End of compulsory education age	17	17	16	16	16	16	18	18	14	14.5	16	16
Age full minimum wage usually applies	20	21	18	16	18	16	21	23	16	25	21	16
Youth Unemployment Rate in 2009 (age 15-24) (OECD 2010a)	36.5%	11.6%	16.6%	15.3%	22.4%	37.9%	21.9%	7.3%	20.0%	25.8%	18.9%	16.4%
Total Unemployment Rate in 2009 (OECD 2010a)	9.4%	5.7%	6.3%	8.4%	9.1%	18.1%	8.0%	3.9%	10.0%	9.6%	7.8%	8.3%
Total Employment Rate in 2009 (OECD 2010a)	67.6%	72.0%	72.9%	71.5%	63.9%	60.6%	61.6%	75.8%	66.3%	61.2%	70.6%	64.8%
Tertiary Education Entry rates in 2007 (OECD 2010b)*	65%	86%	76%	-	-	41%	30%	60%	64%	43%	55%	47%
15-19 year olds in education in 2008 (OECD 2010c)	85.2%	79.5%	74.8%	80.4%	91.1%	78.9%	90.5%	90.7%	81.7%	86.8%	75.7%	87.2%
20-24 year olds in education in 2008 (OECD 2010c)	36.9%	40.5%	38.7%	38.9%	45.3%	34.0%	41.5%	52.1%	36.5%	48.5%	29.3%	38%

*First time entrants as a percentage of the population of the corresponding age group.

Source: (OECD 2010a). Labour market statistics: Labour force statistics by sex and age: indicators, OECD Employment and Labour Market Statistics (database). (OECD 2010b). OECD Factbook 2010. (OECD 2010c) Education at a Glance 2010:OECD Indicators. Table C3.2a.

In Table 1b we show the key facts about the provision of minimum wages for young workers in each country. As this table indicates, four countries provide the full minimum wage for all workers, irrespective of age (Canada, Spain, Portugal and Finland). In Greece the full minimum wage is now not payable until age 25. All the other countries have a youth sub-minimum rate and in several there is a scale of wage for age rates up the full adult rate (Australia, France, Belgium, and the Netherlands). In some cases, the relationship to the adult rate is a fixed proportion according to age (USA, Australia, New Zealand, France, Belgium and the Netherlands). Among our twelve countries, only in the UK is there no fixed relationship although in general the two lower rates have kept pace with the adult. It is worth noting that, where a youth sub-minimum rate exists, the age at which the full rate becomes payable varies – from 23 in the Netherlands to 18 in France.

TABLE 1b: YOUTH MINIMUM WAGES

Country	Youth MWs as a percentage of adult MW rates	Youth Rates
USA	82.5% of full adult MW rate for youth at age 16-18.	Lower minimum wage below age 20 in first 90 days in any job. FT students can be paid 85% of adult wage. Student learners aged 16 and over enrolled in vocational education can be paid 75% of adult rate
Australia	50% for 16 year-olds; 60% for 17 year-olds; 75% for 18 year-olds; 85% for 20 year-olds; adult wages apply at age 21.	Typically a sliding scale applies from age 16 (40-50%) to age 20 (85-100%).
New Zealand	80% for 16-17 year-olds; full MW at age 18.	All employees entitled to adult minimum from age 16. New entrants and trainees can be paid 80%
Canada	100%	Full minimum wage at all ages except in Ontario, which has retained youth rates.
France	80% for 16 year-olds; 90% for 17 year-olds; full MW applies at age 18.	Certain categories of young person receive a reduced rate, provided they have worked less than six months in a sector.
Spain	100%	Full adult minimum from age 16. Those on training schemes for the unemployed can be paid 75%.
Belgium	70% for 16 year-olds; 76% for 17 year-olds; 85% for 18 year-olds; 94% for 19 year-olds; full MW applies at age 21.	Reduced minimum wage by age (6% reduction per year).
Netherlands	30% for 15 year-olds; 34.5% for 16 year-olds; 39.5% for 17 year-olds; 45.5% for 18 year-olds; 52.5% for 19 year-olds; 61.5% for 20 year-olds; 72.5% for 21 year-olds; 85% for 22 year-olds.	Adult wage at age 23. Youth rates increase by age from age 15 to age 22.
Portugal	100%	Full minimum wage at 16 but apprentices and trainees can be paid 80% of full rate.
Greece	84% for those aged 15 to 24	Full minimum wage at age 25 (but varies depending on length of employment and marital status).
UK	61.4% for 16-17 year-olds; 83% for 18-20 year-olds; Full MW at age 21.	No fixed proportion. Youth rates set separately on recommendations of Low Pay Commission for 16/17 year olds and those aged 18 to 20. Separate apprentice minimum rate of £2.50 from October 2010.
Finland	No statutory minimum wage; follows collective bargaining, normally at 100% of adult rate.	Finnish policy between 1993 and 1995 of allowing employers to pay workers under 25 below the agreed minimum rates, within the retail sector.

Source: Low Pay Commission (2009) as amended

3.2 LIBERAL MARKET ECONOMIES

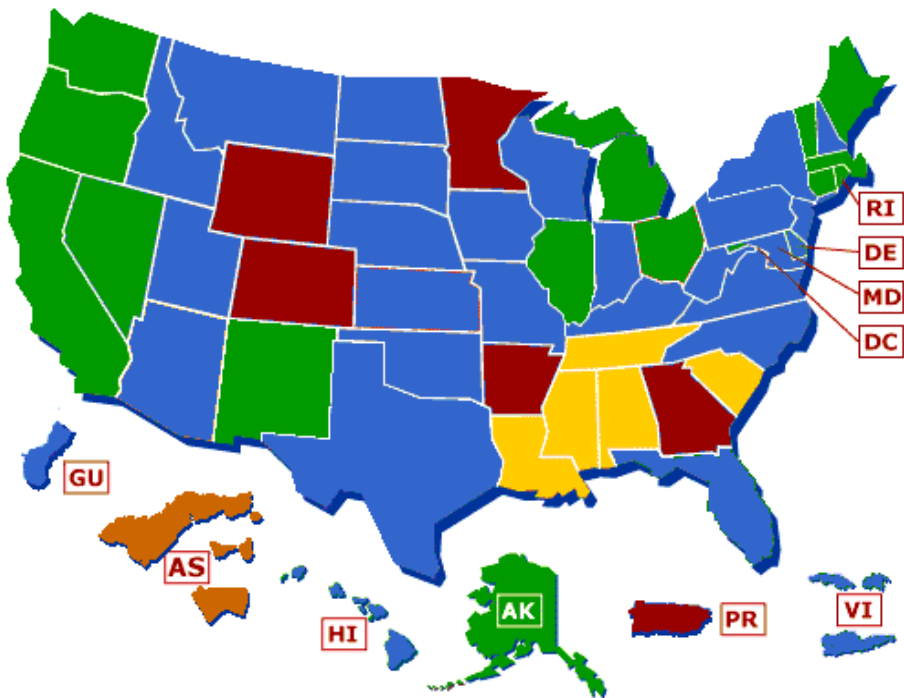
a. USA

In the USA minimum wages are determined at both Federal and State levels. Below we summarise Federal and State minimum wage laws. In addition, we also summarise Federal and State laws and standards that regulate the employment of young employees more widely. All data were drawn from the US Department of Labour (DOL) and were downloaded on or around 1 June, 2010.

The Fair Minimum Wages Act of 2007 established a gradual increase in the Federal minimum wage from \$5.15 to \$7.25 per hour in three successive increments. The final increment became effective on 24 July 2009 and now the majority of US States have minimum wage rates of \$7.25 per hour. The federal minimum wage provisions are contained in the Fair Labor Standards Act (FLSA). The Department of Labour's Wage and Hour Division administers and enforces the federal minimum wage law.

State Variations in the Minimum Wage: Many states also have minimum wage laws. In cases where an employee is subject to both the State and Federal minimum wage laws, the employee is entitled to the higher of the two minimum wages. Map 1, below, summarises the variations in State minimum wage standards relative to the Federal minimum wage. The State minimum wage rate requirements, or lack thereof, are controlled by legislative activities within the individual states.

Map 1: Variations in State Minimum Wage Standards Relative to the Federal Minimum Wage



	States with minimum wage rates higher than the Federal		States with no minimum wage law (Federal minimum applies)
	States with minimum wage rates the same as the Federal		States with minimum wage rates lower than the Federal (Federal minimum applies)
	American Samoa has special minimum wage arrangements		

Fourteen states have minimum wage rates that are higher than the Federal, ranging from Ohio (\$7.30 per hour) to Washington (\$8.55 per hour), 26 states have rates equal to the Federal level, five states have rates lower than the Federal level, ranging from Wyoming and Georgia (\$5.15 per hour) to Colorado (\$7.24 per hour), and five states - (Alabama, Louisiana, Mississippi, South Carolina, and Tennessee) - have no state minimum wage laws.

Young Workers and the Minimum Wage: The Fair Labour Standards Act (FLSA) requires payment of at least the Federal Minimum Wage to be paid to non-exempt

employees. A Federal Minimum Wage of \$4.25 per hour applies to employees under the age of 20 during their first 90 consecutive calendar days of employment with an employer as long as their work does not displace other workers. After 90 days, the Fair Labour Standards Act (FLSA) requires employers to pay the full Federal minimum wage. Employers are not required to meet any training requirements in order to pay an eligible employee the youth wage.

Both the FLSA and many states regulate the minimum age for employment during school and non-school hours, require employment or age certificates, and limit hours and days of work for young workers in agriculture. Under the FLSA the minimum age for agricultural employment is 16 during school hours. Outside school hours the minimum age is 14, or 12 with written parental consent, or on a farm where the parent is employed. The FLSA does not require employment or age certification. Agricultural employment is exempted from or is not listed among the covered sectors in the child labour laws of 17 states: Alabama, Delaware (non-hazardous employment), Georgia, Kansas, Kentucky, Louisiana, Maryland (non-hazardous employment), Mississippi, Montana, Nebraska (covers only work in detasseling and beet fields), North Carolina, Oklahoma, Rhode Island, Tennessee, Texas, West Virginia (non-hazardous employment) and Wyoming. Laws generally exclude minors employed by parents on family farms.

Every state and territory requires children to enrol in public or private education or to be home-schooled. All children are required to continue their education into their high school years, with 26 states setting the cut off age at 16. The remaining states require students to stay in school until age 17 or 18. Employment related provisions differ across States. States regulate the employment of young employees through compulsory school attendance laws that specify minimum and maximum ages for compulsory school attendance but many states prescribe various exemptions.

❖ *Literature*

Below, we assess the empirical evidence on the relationship between the minimum wage and labour market outcomes of young workers in the USA. The review is based on fourteen journal articles. Reaching a clear conclusion on the effect of the

minimum wage on youth is difficult because of differences in the data sets/sources used, methodology, the time frame and the way the minimum wage operates and interacts with other factors. However, a careful reading of these contributions shows that in many cases the impact of the minimum wage on labour market outcomes for young workers might not be as strong as suggested by neo-classical theory and that other factors can play an important role.

We develop our review of the literature in three sub-sections which deal in turn with the effects on employment, schooling and training.

❖ *Effect on young workers' employment*

In this sub-section we focus on seven papers that deal with the issue of minimum wages and teenage employment, using either individual or state level data. Starting from the micro economic evidence, all but one of the papers reviewed analyse employment together with enrolment decisions and displacement effects by formulating four specifications summarising four possible teenagers' labour market outcomes: at school and not employed (SNE), at school and employed (SE), not at school and employed (NSE) and not at school and not employed (NSNE)¹. Neumark and Wascher (1995), using Current Population Survey (CPS) data for the period 1979-1992, show that the effect of the minimum wage on teen employment is quite small; however there is a clear indication that an increase in the minimum wage significantly increases the probability of a teenager becoming idle (NSNE) and leaving school. These results are generally supported by a more recent paper by the same authors (Neumark and Wascher 2003), using updated CPS data. In some of the specifications presented in the papers the authors show that the minimum wage has a positive effect on the proportion employed but not at school.

Similar conclusions can be found in the analysis by Turner and Demiralp (2001). Here the authors find that although the minimum wage has a negative effect on schooling, it has a positive effect on employment as workers in all categories considered in the analysis are more likely to become employed and less likely to

¹ In this section we focus on the results related to employment, while enrolment decisions are discussed in the next section.

carry on studying following a minimum wage increase. This analysis is based on the Survey of Income and Program Participation (SIPP). The authors claim that this source provides better information on teenage employment and enrolment decisions than the CPS. This study adds a further perspective to those offered in previous work by taking into account differences between individuals in terms of age, race, gender and whether they live in towns. Their results show that older teens (18-19 years old), non-Hispanic and non-Black teens and females are more likely to leave school and find employment. Living in an urban area also means that teens are more likely to enter employment following a minimum wage hike. Currie and Fallick (1996) use data from the National Longitudinal Survey of Youth but only consider the dependent variable of employed or unemployed without explicitly considering education. Using a fixed effects approach to account for the unobserved constant differences between individuals, they find that those young people employed prior to the 1979 and 1980 federal minimum wages were around 3 per cent less likely to be employed a year afterwards.

Turning to the evidence based on national time series data, all the papers reviewed in this sub-section address the issue of the weak relationship between minimum wages and employment. This subject was initially discussed in Brown, Gilroy and Kohen (1982) and later in Card and Krueger (1995). In these papers the authors noticed that up to 1979 estimates of the impact of the minimum wage on teenage employment revealed a negative impact; however, when using a longer time dimension covering the 1980s, the minimum wage coefficient lost statistical significance, suggesting a decline in the effect of the minimum wage over time. However, these initial estimates were highly unstable because they were plagued by serial correlation problems and specification issues.² Park and Ratti (1998) address these problems by first analysing the properties of the data included in a typical time series model. The authors observe that the dependent variable (the ratio of civilian employment to civilian population for teenagers) is stationary but most of the explanatory variables are $I(1)$, i.e. they are stationary only in first differences. This means that results based on the equations specified in levels will generate spurious results. The authors then compare the results based on non-stationary data and on

² A clear discussion of this problem can be found in William and Mills (2001).

stationary data³. While the former suggest a negative and significant impact of the minimum wage on teens' employment, the latter show that such effect is not statistically significant, thus substantially changing the importance of the relationship. These results are robust to the inclusion of seasonal effects⁴ and ARCH (autoregressive conditional heteroskedasticity) effects.

The issue of stationarity is further discussed in Williams and Mills (2001) where, starting from a replication of the results in Card and Krueger (1995), the authors show that by using a more sophisticated dynamic specification one can achieve a better understanding of the relationship between a minimum wage and teenage employment. Williams and Mills' criticism of the earlier analysis rests on two main arguments: firstly that the OLS estimator, as underlined above, will produce spurious results in the presence of variables that are non-stationary and non-co integrated. Secondly, that the minimum wage variable is likely to be endogenous and that this creates a problem of biased and inconsistent estimates. To support their claim, the authors compare results based on simple OLS and results based on more dynamic model specifications. The OLS estimates reveal the same pattern of results discussed in Card and Krueger (1995), i.e. the significance of the impact of the MW on teen employment decreases and becomes statistically insignificant when considering longer time periods. Tests for stationarity confirm the results in Park and Ratti (1998), providing further confirmation of the spurious regression problem. The use of a dynamic labour demand model, including lagged values of the dependent and the independent variable, allows Williams and Mills to address the non-stationarity problem and to account for other factors that might affect the relationship between minimum wage and teenage employment, such as adjustment costs and employers' expectations about future minimum wage increases. To address the endogeneity issues the authors use system estimation (VAR –Vector Autoregression Analysis). Their results show that the minimum wage explains between 3 per cent and 12 per cent of the total variation in teenage employment. A simulation exercise shows that a 10 per cent increase in the minimum wage initially

³ Non-stationarity is eliminated by taking first differences of the series.

⁴ Park and Ratti (1998) note that seasonality has always played an important role in evaluating the time series evidence of teenagers' employment.

causes a decline in teenage employment, which reaches the maximum value after two years (approximately 4.5 per cent). However, the effect disappears after four years.

Bazen and Marimoutou (2002) extend the time series evidence by focusing on the stochastic nature of the seasonal, cyclical and trend components in teenage employment. A previous contribution by Solon (1985) had already demonstrated that treating these components as deterministic is not appropriate, while Koopman *et al* (1995) claimed that a correction for the presence of first order residual autocorrelation imposes a very restrictive dynamic model which is unable to capture the relationship between minimum wage and teenage employment. Bazen and Marimoutou (2002) re-estimate the earlier model and show that their predictive power is quite strong until the late 70s, while failing to account for the changes in teenage employment for the period 1980-1993. The authors argue that, when analysing a longer time period, dynamic models need to allow for more flexibility in the various components using a structural time series model. Their results show that increases in the real minimum wage have a negative impact on teenage employment. Within the same quarter, if the real minimum wage increases by 1 per cent, teenage employment will decrease by 0.1 per cent. In the long term it will decrease teenage employment by 0.2 per cent. Overall this model suggests that the effect of the minimum wage is significant but rather smaller. Moreover, the authors show that the impact is even smaller if average wages increase, given that the results show a positive relationship between average wages and teenage employment in the long run.

❖ *Impact upon participation in education*

Another aspect of particular concern is whether an increase in the minimum wage and, in the case of the UK, increasing coverage to include teenagers, can have a negative impact on schooling decisions and, by extension, on future skill development and job opportunities. This aspect is particularly difficult to assess because teen workers are more mobile and their employment and/or schooling decisions are likely to change in a fairly short period of time. There are also other factors that might affect their choices and the outcome of these choices, for example

the economic cycle or family background. Most of the papers reviewed introduce controls for these factors in an attempt to disentangle their impact on youth employment from the effect of the minimum wage.

We start our discussion by examining two earlier contributions by Neumark and Wascher, both published in 1995. The first paper (Neumark and Wascher 1995a), based on state level data for the period 1977-1989, shows that the minimum wage has a negative impact on enrolment and a positive impact on the number of workers not enrolled and not in employment. Additionally the authors find evidence that the minimum wage increases the employment of more skilled workers and decreases the employment of those with lower skills (the disemployment effect). In a parallel work, Neumark and Wascher (1995b) further address the relationship between minimum wages and education using individual data derived from matched Current Population Surveys (CPS) for 1979-1992. They analyse the enrolment decision together with the displacement effect as the two phenomena are assumed to be related under the main hypothesis. As discussed in the next part of this section, all teenagers are divided into four groups according to their education enrolment status⁵. At first sight their results seem to support the authors' main hypothesis, i.e. that a higher minimum wage increases the demand for higher educated teenagers to reduce their schooling, while at the same time driving the lower skilled out of their job. In fact, the estimates reveal that increases in the minimum wage positively affect the probability of becoming idle (NSNE) and reduce the probability of being at school and employed (SE). Looking at transitions across the four categories considered in two consecutive years, the authors find that teenagers in all categories in year one are less likely to be in SE in year two and more likely to be in the NSNE group.

A closer look at the results reveals that the effect of minimum wages is particularly large for the 18-19 year olds, compared to the 16-17 year olds. In fact, for the 18-19 year olds the authors find a large, positive and significant effect on the probability of moving from SE to NSE. Their interpretation is that more skilled workers (the more educated employees) are displacing less skilled workers (the younger employees).

⁵ These groups are: at school and employed (SE), not at school and employed (NSE), at school and not employed (SNE), not at school and not employed (NSNE).

However, the distinction between the two age groups also suggests that workers that reach the school leaving age are more likely to leave school. This is quite a predictable outcome. It is possible that the school leaving age is having an impact here, as we discuss below.

Some US studies find a negative relationship between the minimum wage and school enrolment (Neumark and Wascher 1995, Turner and Demiralp 2001) but these do not directly address the relationship. Turner and Demiralp (2001) use the same methodology as Neumark and Wascher (1995b) but a different data set, the Survey of Income and Program Participation (SIPP). The main advantage of this survey is that it attempts to follow teens moving out of their parents' household. A number of youths aged 16 to 19 were interviewed first in 1991 and then again the following year. The paper particularly refers to the proposed increase in the federal MW from \$5.15 to \$6.15 per hour and attempts at evaluating the possible outcomes. Similarly to Neumark and Wascher, the authors find that an increase in the minimum wage reduces the probability of enrolment. However, and contrary to previous evidence, an increase in the minimum wage reduces the probability of becoming idle, i.e. not at school and not employed. The analysis also accounts for differences in the 16-17 and 18-19 age groups and supports the evidence that the 18-19 years old are more likely to leave school and become employed compared to those aged 16-17 years. Therefore this study confirms the negative impact of the minimum wage on schooling but, contradicting the conclusions of Neumark and Wascher, also provides evidence that the minimum wage reduces the number of idle teenagers.

Looking more closely at the schooling effect, Chaplin *et al* (2003) analyse the impact of the minimum wage on school enrolment while controlling for the ethnic background, urban status and different compulsory schooling laws in different US states. Their analysis is based on data on high school enrolment from the Common Core of Data, collected by the US Department of Education. The number of observations is not as large as other data sources such as the CPS but the authors claim that this data source provides more accurate information on enrolment. Their results show that the minimum wage does not significantly affect enrolment rates. However, when the minimum wage interacts with different actual school leaving ages, the interaction variable has a significant impact in those states where the

school leaving age is 16 or less. Yet, independent of the minimum wage, the continuation ratio is lower in states where students are allowed to leave school at age 16 or less. This effect is stronger than the effect induced by the minimum wage. There are no statistically significant effects when the actual leaving age is above 16 years old. Thus it appears that the main factors affecting schooling decisions are linked with the compulsory schooling laws rather than the minimum wage legislation. The authors themselves suggest this conclusion and also discuss possible policies to adopt in states where the legal school leaving age is 16 or less, such as the requirement of parental permission to enter the labour market. The study shows that the minimum wage has an effect only in those states where teenagers are allowed to leave school early by law. In states where the dropout age is above 16 years old there is no minimum wage effect. The policy implication is to either increase the legal school leaving age or adopt measures that require some form of parental consent for very young workers to leave school and enter the labour market.

Neumark and Wascher (2003) provide additional evidence on the relationship between schooling and the minimum wage. They also address a series of criticisms presented by Evans and Turner (1995) related to the use of the correct definition of school enrolment⁶. The analysis is based on a simple regression of enrolment rates for the 16-19 year olds on the minimum wage variable and other covariates such as the unemployment rate and a dummy variable for a compulsory schooling age. The analysis shows that the minimum wage has a significant and negative effect on enrolment rates. The first set of results looks at the effect of the minimum wage on 4 enrolment/employment categories for 16-19 year olds, an approach similar to that of their previous analysis. A particularly robust result is the positive and significant effect of the minimum wage on the proportion of teenagers neither in school nor employed (idle) in the period 1980-1989: ‘...regardless of the month, enrolment measure or covariance matrix used in the model, as long as the data are measured in a time consistent manner’. In fact, the result disappears only when there are inconsistencies in the data, discussed at length in the paper. The presence of such

⁶ Specifically Evans and Turner (1995) claim that the definition of school enrolment in Neumark and Wascher (1995) is too narrow because it does not include individuals attending school on a part time basis.

inconsistencies is the main criticism of the results in Evans and Turner (1995). Neumark and Wascher also use an extended sample (1980-1998), and note that the size of the impact of the minimum wage on the proportion of idle teenagers is much smaller than in the 1980-1989 sample period (0.18 compared to 0.64). Additionally, the authors find the minimum wage to have a positive and significant impact on the proportion of workers employed but not enrolled. A second set of results concentrates on a simple regression of enrolment rates for 16-19 year olds on the minimum wage variable and other covariates such as the unemployment rate and a dummy variable for compulsory schooling age. The analysis shows that the minimum wage has a significant and negative effect on enrolment rates, particularly when relaxing the assumption of serially independent and homoscedastic errors. Interestingly, this effect becomes insignificant in states where the compulsory schooling age is 18, while it is stronger in states where the compulsory schooling age is less than 18. This result is consistent with Chaplin *et al* (2003).

A consistent result observed in Newmark and Wascher (1995b) is the increase in the probability that teenagers become idle after an increase in the minimum wage. The authors claim that following a minimum wage increase individuals start queuing up for jobs. This is certainly a possibility; however, alternative explanations could also be valid: for example individuals may be queuing up because they do not immediately find a job or they might not find the job they want.

Neumark and Wascher (2001) widen the analysis of the relationship between schooling and the minimum wage by looking at the training obtained to qualify for workers' current jobs. This includes training carried out within the schooling system as well as additional training courses (such as formal company training programme or informal on-the-job training.). The analysis uses CPS data for 1983 and for 1991 and it classifies workers into three age groups: 16-24, 16-19, 20-24. This cross sectional analysis for the year 1991 introduces a time dimension via the construction of the minimum wage variable (the percentage by which the state minimum exceeded the federal minimum over the previous 3 years) and in the use of a control group for the year 1983. The descriptive analysis is very detailed and shows interesting differences among the different age groups. The descriptive analysis shows that a higher proportion of 16-19 year olds are paid the minimum wage and

that the highest incidence of training is among the 20-24 age group. The authors suggest this produces evidence that those aged 20-24 are likely to be more affected by the minimum wage than those 16-19. Because of high turnover, teenagers may be in jobs that require little if any training.

The study reveals some inconsistencies between the descriptive statistics and empirical analysis. For example, the descriptive analysis shows that the proportion of workers undertaking training to qualify for their present job is higher in states with higher minimum wages. However, the econometric analysis does not find any significant effects of this phenomenon, the only exception being a positive and significant effect of the minimum wage on school training for the 16-19 age group. For the 20-24 year olds there is a negative minimum wage effect. Overall, very few coefficients are statistically significant.

The analysis is very rigorous but the results are not always convincing. The authors present two sets of results, with and without demographic variables. In many instances the size and the significance of the coefficient estimates drop when accounting for these demographic factors. Because no information is provided on the econometric performance of these additional variables it is impossible to assess whether they should be included or not. Similar to the study by Chaplin *et al* (2003) all specifications include an interaction term between the MW and the age of the individual, but the minimum wage is not included as an explanatory variable on its own. Again, this might affect the results.

❖ *Minimum wages and on-the-job training*

The third aspect analysed concerns the possible impact of the minimum wage on training undertaken while working. The earlier evidence on the relationship between minimum wages and on-the-job training is rather mixed. Hashimoto (1982) and Leighton and Mincer (1981) claim that a binding minimum wage will reduce training. On the other hand, Card and Krueger (1995) do not find any significant minimum wage effect in the fast food industry in Texas. A more recent and frequently cited work is Grossberg and Sicilian (1999). This contribution does not focus on young workers but it provides a starting point for reviewing the more recent evidence as it

has provoked further related study. A peculiarity of this work, compared to most of the existing studies, is the use of firm level rather than individual data. The data are derived from the Employment Opportunities Pilot Project (EOPP) and include 3000 firms. This is a cross sectional analysis for the year 1982. The information mainly relates to the South and Midwest and predominantly consists of small and low-wage employers, so care must be used in generalising from the results. The authors estimate a training intensity equation for men and women under assumptions of different effects for the two groups of workers. Their results show that the coefficient on the minimum wage variables for male workers is negative and statistically significant, indicating that male workers who start at the minimum wage have a lower probability of being trained. However, further tests show that there is no significant difference between the quantity of on-the-job training received by workers in minimum wage jobs and the amount of training received by workers in other low-paying jobs. These findings indicate that as far as training is concerned the *type* of job matters more than the minimum wage status. This confirms existing descriptive analysis showing that minimum wage workers are likely to be employed in sectors that requires less training. For women starting at the minimum wage the coefficients are positive but not statistically significant, indicating that they do not experience lower training than their male counterparts.

An early reaction to this set of results came from Neumark and Wascher (2001), who aim to re-assess the relationship between the minimum wage and training using employee data and, in particular, to address some specification issues in Grossberg and Sicilian (1999). The econometric analysis is carried out for all young workers (16-24 years) and for two subgroups: 16-19 year olds and 20-24 year old workers. Accounting for the two age groups reveals interesting results that are particularly relevant for UK policy. In fact the evidence shows that the minimum wage reduces the incidence of on-the-job training among 16-24 and 20-24 year olds. The estimated effect is significant at the 10 per cent level. However, for teenage workers the effect is negative but not statistically significant. As discussed above, these results are sensitive to the introduction of demographic variables. When considering individual characteristics the only result which is robust across different specifications is the negative impact of the minimum wage on the formal training of 20-24 year olds. The

results show that the minimum wage has no effect on the training of the youngest group of workers.

The type of data used in Neumark and Wascher (2001) is criticised by Fairris and Pedace (2004). They claim that an analysis of the impact of the minimum wage on training should be undertaken using establishment level data because ultimately the firms pay for the training and not the worker. Similarly to Grossberg and Sicilian (1999), Fairris and Pedace (2004) analyse the impact of the minimum wage on on-the-job training using an Employer Survey (NES) and the study does not focus on young workers. The paper aims at addressing the issue of poor measurement of on-the-job-training as well as controlling for establishment-level characteristics that can affect training. The sample size is fairly large (a cross section of 1098 observations) and the NES provides detailed information about hours of training and percentage of workers training. These are better measures than the commonly used dichotomous variable (training/no training) so the data are particularly fit for their purpose. The authors do not find any significant impact of the minimum wage on the average hours of training per worker. This result is very strong and consistent across all specifications presented in the paper. The evaluation of the impact of the minimum wage on the percentage of workers receiving training is rather more problematic as results change across different estimation techniques and different measures of the minimum wage. The analysis is carried out in a very rigorous way and the authors openly discuss the shortcomings of each of their specifications. They themselves conclude that the evidence of the effect of minimum wages on the percentage of workers receiving training is mixed and particularly weak.

An in-depth analysis of the relationship between the minimum wage and on the-job-training is presented in Acemoglu and Pischke (2003). The contribution is particularly interesting because the authors present a detailed theoretical model showing that deviations from perfectly competitive markets, which introduce firm-specific rents and prevent workers from financing their own training, change the conclusions of Becker's theory, which means that the minimum wage can increase investments in general training. The empirical analysis uses the National Longitudinal Survey of Youth (NLSY). This is a panel of youths which oversamples those from disadvantaged backgrounds. It contains a relatively high number of low wage

workers directly affected by minimum wage increases. However, the sample period used excludes very young workers. The NLSY is a panel of youths aged 14 to 21 in 1979 but the analyses follow the cohorts from 1987-1992 (so the workers will be 22-27 years old). The authors estimate two specifications: a specification in first differences, which is a new methodological contribution, and a specification in levels, which allows comparisons with previous studies. With regard to first differences the authors find no significant effect of minimum wages on training, using different control groups. The results also show that workers starting a new job are more likely to receive training. This effect is highly significant (but unrelated to the minimum wage).

In the estimation in levels most of the results show no or little effect of the minimum wage on training even when considering several factors that might affect the results (sample characteristics, measurement errors, training measure used). This contradicts previous evidence presented in Neumark and Wascher (1998) and Leighton and Mincer (1981). The introduction of region, time and the individual as factors is what mainly renders the coefficients non significant, but the authors claim that these effects must be accounted for.

Schiller (1994) analyses the impact of minimum wages on training and wage gains of workers aged 15-23, using the NLSY. The age of the workers ranges between 14-22 at the beginning of the sample and 22-30 at its end. The survey is particularly suitable for conducting this type of analysis as it contains specific questions on training. The authors estimate two equations: a training equation (using a logit model) and a wage growth equation (using OLS). The analysis is based on a large sample of workers followed over the years 1979-1987. A simple analysis of the data reveals that over 85 per cent of the minimum wage entrants state that they liked their jobs and over 60 per cent felt that they were learning skills that would be valuable in attaining better jobs. Over half of the minimum wage workers perceived opportunities for promotion with the same employer. However, the logit analysis reveals that minimum wage status does reduce training. The descriptive analysis also reveals that few minimum wage entrants stay in minimum wage jobs for over three years. The analysis concludes that a large majority of young workers do not feel trapped in

low wages jobs with low training opportunities but feel that they are gaining valuable experience, and that they have chances for promotion.

❖ *Conclusion*

We examined three key areas and summarise the results for each in turn below.

Minimum wages and employment: there is some evidence of the former having a positive effect on the latter. When the effect is negative, it is small and in most cases it tends to disappear in the long run (the only exception is Bazen and Marimoutou 2002).

Effect of minimum wage on schooling: there is little effect in states where teenagers are allowed to leave school at age 18. The school leaving age is more relevant than the minimum wage.

Effect on training: here there are very mixed results. There is possibly a prevalence of negative effects but these are not always statistically significant. It is important to note that individuals entering at the minimum wage do not perceive themselves to be in a disadvantaged situation; rather they believe they are gaining important experience.

b. Canada

Canada has a comparatively long history of legislative intervention in wage setting with – albeit piecemeal province-level - regulation of minimum wages dating from 1918 (Thomson & Taras, 2004). The current framework of a Federal directive laying down the principle of a minimum wage with Provincial/Territorial discretion for the setting of rates dates from 1960. It should be noted that rates across Canada have historically been tiered according to various criteria including the distinction between urban and rural workers and, more controversially, men and women workers (abolished in the 1970s). Although gender and intra-province differentials have been formally abolished, the framework is still substantially tiered with distinctions

prescribed for, among other things, piece-rates for picking different types of fruit in the agricultural domain and, more pertinently, between 'youth' and adult workers.

Across the Provincial/Territorial jurisdictions, rates vary by approximately \$2 Canadian per hour, with minimum rates calculated on the basis of the retail price index as prescribed federally. In some Provinces/Territories, there have been numerous exemptions to the published 'adult' rate for young ('student', 'entry-level', 'youth') workers and those in particular industries (e.g. liquor, where gratuities are customary). Currently only Ontario has a lower youth rate.

The minimum wage agenda has created certain policy problems for the authorities, particularly where unemployment/underemployment among school leavers has been a problem (see Campolieti *et al*, 2005). Conversely, some policy makers see problems with minimum wages disincentivising staying on at school post-16. However, policy makers have also seen the need to mitigate poverty and social exclusion resulting from low wages.

From the articles examined, only the employment effects and impact upon participation in education were covered. No papers were found covering the effect of the minimum wage upon the training of young people.

Compulsory education ends at age 16 in Canada but over 80 per cent of those aged 15 to 19 are in education. Youth unemployment is relatively low at 15.3 per cent, but higher than the total unemployment rate of 8.4 per cent.

❖ *Impact on employment*

Canada is geographically proximate to the USA and although substantial historical, cultural and institutional differences are evident between the two employee relations systems, the scholars who approach the analysis of labour issues therein tend to factor in a priori that there is isomorphism between them. Commentators have highlighted the problems of using econometric models developed in the US in a Canadian context (see Campolieti *et al*, 2005a, 2005b, and 2006; Landon, 1997).

Although literature on the impact of the minimum wage on youth employment and related issues in Canada is not extensive, what exists tends to be based in an institutional economics frame of reference using panel data from Canadian Labour Force Surveys (Baker *et al*, 1999; Campolieti *et al*, 2005a, 2005b and 2006; Edagbami, 2006; McDonald and Myatt, 2004; Swidinsky, 1980; Yuen, 2003). They then seek to draw conclusions relating to the impact on unemployment levels and real wage levels. These studies generally find a negative effect of minimum wages upon the employment of young workers.

Few studies undertake any investigation of education or skill formation, Landon (1997) being a notable exception, although the age of this study perhaps compromises its impact.

Swidinsky (1980) can be seen as the 'classic' study of the relationship between minimum wage interventions and youth employment and is frequently cited, although its age might be seen as a limitation. In common with subsequent studies, he appears to have established a relationship (positive) between the intervention and levels of youth unemployment, suggesting that interventions are, in principle, harmful to employment prospects.

Subsequent studies have sought to build on his analysis and correct apparent methodological limitations. However, despite attempts at meta-analysis and critique, the majority of studies appear to be locked into this frame of reference (see Edagbemi, 2006).

❖ *Impact on participation in education*

Landon (1997) found a negative effect of minimum wages upon participation in education with the larger the minimum wage increase the larger effect on drop-out rates. The findings of this paper are somewhat controversial as they appear to refute both the human capital and social democratic policy orthodoxies which maintain that increased resourcing of education will result in higher educational participation and attainment (a position which previous economic analyses have taken, also refuted by the author on methodological grounds). Landon suggests (with certain caveats) that

the level of the minimum wage in each province is a greater determining factor on whether youths drop out of high-school or not.

Landon (1997) explains that this is due to the opportunity costs of education being increased as employment seems like a more attractive option. Also, with a higher minimum wage, employers are more likely to seek to invest in higher value full-time workers than part-time, hence high school students are incentivised to drop-out. The author emphasises that socio-economic and geographical variables are significant in these patterns, however. Also, there are variations between 16 and 17 year olds and between males and females (males being more likely to drop out). Ultimately, the message is: if policy makers want youths to stay on at high school in order to increase the chances of higher educational attainment, they should take the level of the youth minimum wage into account in their interventions.

Campolieti et al (2005a), however, found no net effect on school enrolment or on the individual transition probabilities and no significant substitution of students for non-students leaving school to queue for the higher minimum wage.

❖ *Conclusion*

From the limited literature, if any lessons were to be learned, they would probably relate to how policy impacts those industries that rely on a young, flexible workforce. The UK retail and hospitality sectors rely on a flexible youth labour force, many of whom will be simultaneously in post-16 education. It is possible that, should the relative level of the minimum wage be altered, there could be a negative impact on educational participation and achievement.

c. Australia

Minimum wage regulation in Australia is both long-standing, extending back to the end of the nineteenth century, and complex – involving provisions set at both state- and national-level within the Australian federal system. Australia first adopted a minimum wage system in 1907, following the ‘Harvester case’, in which the presiding

judge of the Court was required to establish 'fair and reasonable wages'.⁷ 'Margins' were subsequently added to this on the basis of skill, using benchmarks derived from the metalworking industries. The situation regarding minimum wages in Australia has been in flux in recent years. In 2010 a set of minimum national employment standards, including a national minimum wage, were established. These have displaced state-level provisions. Additional complication is added by the fact that in the past some states were in the federal jurisdiction and some were not.

From 1997 the Australian Industrial Relations Commission set a 'safety net' of wage increases for workers who had not secured increases through enterprise bargaining (Cowling and Mitchell, 2007), which co-existed with federal and state minimum wages (some of them below the federal level). The Workplace Relations Amendment Act 2005, known as 'Work Choices', exempted small firms from employment protection legislation and restricted trade union rights. The Act also established the Australian Fair Pay Commission (AFPC), which replaced the Australian Industrial Relations Commission. The role of the AFPC was to set and adjust a single adult national minimum wage, non-adult minimum wages (such as training wage), minimum wages for award classification levels and casual loadings. According to Cowling and Mitchell (2007), this step was motivated by the view held by the national government that safety net increases had been 'inimical to the goal of generating additional jobs, apprenticeships and traineeships, and that such adjustments should be confined to the lower paid'. The policy was supported by claims 'of the negative effects on employment arising from the operation of the current Workplace Relations Act' (Department of Employment and Workplace Relations, cited in Cowling and Mitchell, 2007), although no estimates were provided by the DEWR.

The Fair Work Act 2009 was introduced by the Labour Government in a step intended to reverse much of the change introduced in 1996 and 2005/6. However, there has been no reversal of centralisation, and the enacted measures listed below mean that virtually the entire private sector workforce is now covered by minimum standards set federally. The Act established Fair Work Australia (FWA) as a new government industrial relations institution which began operations on 1 July 2009.

⁷ Wage boards had been established in some states in the latter years of the nineteenth century.

Under the provisions of the Act a national system of ten employment standards was established, providing a floor of minimum conditions. There are therefore a number of instruments that regulate minimum pay (defined as the base rate of pay for ordinary hours worked). The situation is still in flux from the preceding arrangements, and some issues are regulated by transitional provisions.

From 1 January 2010, modern awards replaced most existing awards and set minimum terms and conditions for employees in particular industries and occupations. While modern awards mostly prescribe minimum wages, there were transitional arrangements in place, under which the wage-related components did not come into effect until 1 July 2010, and may be phased in over five years.

Minimum wages under modern awards may include: wage rates for adults, in some cases, on a scale reflecting experience and qualifications; wage rates for juniors, employees with a disability, and employees undergoing training; 'casual loadings' (additional pay for casual employees, see also below); piece rates. An employee may not be paid less than the rate of pay applicable to them under a modern award.

Employees not covered by an award or enterprise agreement are guaranteed the Federal (National) Minimum Wage. Under the Fair Work Act (2009) the provisions regulating the minimum wage were amended, with a new statement of the aim of the minimum wage and the role of the new Fair Work Commission in setting and adjusting the rates, conducting appropriate consultations with interested parties and commissioning research.

Under the Fair Work Act of 2009, Fair Work Australia must 'establish and maintain a safety net of fair minimum wages', taking into account: national economic performance, promotion of workforce participation, needs of the low paid and relative living standards, equal pay, fair minima for young workers, trainees and those with a disability. Fair Work Australia took over this responsibility from the Australian Fair Pay Commission (AFPC) in 2010. The AFPC was abolished in December 2009. The first review by Fair Work Australia by the new Minimum Wage Panel took place between March and June 2010.

The national minimum wage does not apply to 'junior employees' (i.e. an employee aged under-21); employees in a 'training arrangement' (i.e. trainees and apprenticeships) and employees with a disability. Employees in the first of these two categories (young people and trainees and apprentices) will not have a national minimum wage set for them under the new arrangements until the 2011 review, with a requirement to set a national minimum wage for award/agreement free junior employees as from 1 July 2011. This has left them temporarily without a national minimum wage. However, these employees may be covered by state minimum wages, which provide for deductions from the adult rate for employees not covered by an award or agreement for employees still within state employment systems, as well as under the modern award system at individual industry level. Awards typically include special rates for young workers.

The minimum wage in 2008 was equivalent to 45 per cent of mean earnings, and 52 per cent of median earnings. Both figures indicate a decline in the relative value of the minimum wage in recent years (OECD, 2010).

School education in Australia is compulsory between certain ages. Depending on the state or territory, school is compulsory from the age of five or six to the age of 17 (school leaving ages were raised in most states between 2005-9, most recently in 2009 from 15 to 17 in Northern Territories). According to the OECD, until recently more Australians left school at 16 than in most other OECD countries, with the incentives for staying-on diminished by the attractions of employment during a long economic upswing.⁸ Despite this, the system is seen as not being characterised by a 'long-tail of underachievers' and as contributing to high social intergenerational mobility.⁹ However, there are concerns about upper-secondary achievement, and this has been addressed in part through raising the school leaving age in most states to 17. There is also a programme of trade training centres in schools.

Youth unemployment in Australia is relatively low at 11.6 per cent but higher than the total unemployment rate of 5.7 per cent. Almost 80 per cent of those aged 15 to 19

⁸ OECD (2009) *Jobs for Youth: Australia*, Paris: OECD.

⁹ Koutsogeorgopoulou, V. (2009) 'Enhancing educational performance in Australia' OECD Working Paper, No. 678.

are in education, following increases in the school-leaving age. These and other changes in the past two decades have cut the proportion of the adult population (25-64) with below upper secondary education from 47 per cent in 1997 to 30 per cent by 2008, with 82 per cent of the 25-34 age group now having at least this level¹⁰.

❖ *Literature*

There is limited econometric research on the impact of minimum wages in Australia, and only one study specifically concerned with its impact on young people has been located (Mangan and Johnston, 1999). This resorting to estimates derived from outside Australia was also noted by Leigh (2003 - see footnote below).¹¹ In his own study, Leigh (2003) takes advantage of the scope for a 'natural experiment' by using changes in the state minimum wage rate in Western Australia and comparing this with the rest of Australia. Until 2006, state minima were in force and the studies looked at below are based on state minimum wages. No literature was found concerning participation in education or the effects on training for young workers.

The studies considered are: Mangan and Johnston (1999) on youth minimum wages and employment, Leigh (2003) on minimum wages and employment (including a commentary by Watson (2004) and an Erratum by Leigh (2004) and Junankar et al (2000), which is essentially a sceptical paper on the validity of estimations of wage elasticities.

Mangan and Johnston (1999) found a small and negative impact of declining differentials between youth rates and adult rates on employment. For Queensland, the partial elasticity for full-time (f/t) employment was -0.27 (15-19 year-olds) and -0.28 (15-17 year-olds). For part-time employment the only statistically significant result was -0.07 for 15-17 year-olds. For Australia, the elasticity for full-time employment was -0.17 (15-19 year-olds) and -0.05 (15-17 year-olds). For p/t employment the only statistically significant result was -0.21 for 15-17 year-olds.

¹⁰ OECD (2010) Education at a Glance

¹¹ Leigh notes '...debate in Australia has focused around empirical estimates from other countries' (ibid. 361). The bulk of these studies look at debates in the USA and the UK; Junankar (2000) notes the OECD 1998 *Employment Outlook* review.

There was some evidence for higher supply of labour as minimum wages rose. However, no statistically significant results were found running one of the standard regressions (Mincer, 1976). Mangan and Johnston (1999) suggest that wage differentials between young people and adults can have a positive impact on employment, but the effect is very small and wage differentials are unlikely, therefore, to have a major impact in determining youth employment and enrolment. However, the effect could be sufficient to 'sustain those youth jobs that are currently dependent on the adult/youth wage differential' (Mangan and Johnston, 1999). An effect perceived to be more important was the introduction of a compulsory training element through a training wage, the expected widening of differentials between adults and young people, and the shifting of some of the burden to the individual and government, in consequence of which employers would be more likely to hire on such contracts.¹²

Leigh (2003) found small negative elasticity of employment using a difference-in-differences approach, comparing changes in employment in Western Australia with changes in the rest of Australia when there were differences in minimum wages between the two. For all age-groups the elasticity was -0.29. Young workers seemed to be more affected than other groups (-0.39). This study attracted a particularly pointed rejoinder (Watson, 2004) disputing the feasibility of the 'quasi-experiment' involved as the basis for a difference-in-differences approach, and also questioning the regressions. The first elasticity quoted is based on an erratum issued by Leigh (2004), but the figure for young people was derived from the initial study, which was not re-run.

Junankar et al (2000) ran a series of estimations, but concluded that 'only in a very few cases were wage elasticities negative and significant'. In most cases, the estimated elasticities 'are almost always incorrectly signed or statistically insignificant'. The elasticities they did derive that were appropriately signed and significant were in line with much of the international literature (-2.05 to -3.1).

¹² A training wage was introduced under a National Award (National Training Wage Award, 2000) and applies to approved training; there are separate provisions for apprenticeship schemes.

However, these applied to only very specific demographic groups.¹³ There was no theoretical model to suggest why specifically only these groups from a much larger sample of employees generated elasticities. The intention of the paper is to cast doubt on the exercise in principle.

❖ *Conclusion*

The three Australian empirical studies that aimed to establish elasticity of employment in respect of the minimum wage showed a small negative elasticity in line with other international work. However, one of these studies (Leigh, 2003, 2004) was the object of a methodological critique that cast serious doubt on the suitability of the 'quasi-experiment' used to generate the regression estimates. Mangan and Johnston (1999) also derived statistically significant coefficients in only a small proportion of their estimates, and cast doubt on the policy significance of their findings, given a range of other potential determinants. The same consideration also applies to Junankar et.al. (2000) who argue that only two significant elasticities emerged from a large number of estimations.

The Australian situation is not readily comparable with that in the UK because of the federal structure and the existence of regulated wage scales for other employees, which makes Australia closer to a country such as the Netherlands or France, where a minimum wage co-exists with extended industry agreements.

On balance, there seems to be little consensus either on results or methodology in Australia. The differences between the Australian situation and the UK also limit the direct policy significance of the Australian studies for the UK.

d. New Zealand

New Zealand introduced a system of enforceable wage floors set by statutory authority in 1894. In its modern form, under the Minimum Wage Act of 1983, a

¹³ For full-time 18-year old males in manufacturing there was a short-run elasticity of -3.1 and for full-time females in retailing a long-run elasticity of -2.05.

national statutory minimum wage of \$2.50 per hour¹⁴ was set for workers aged 20 or over. During the 1980s this was accompanied by sectoral legal floors, usually above the statutory minimum wage, for industries covered by union bargaining awards.¹⁵

This ended with the introduction by the National Party of radical changes to employment relations through the Employment Contracts Act (ECA), 1991, intended to reconfigure relationships between employers and trade unions. The statutory minimum wage became the only legal wage floor: a youth minimum wage, 60 per cent of the adult minimum, was introduced for 16-19 year-olds in 1994, partly in response to the removal of some 'basic labour market protections' by the ECA (Maloney and Pacheco, 2009). Aside from that, rises in the minimum wage were modest until 1999, and its value fell slightly in real terms and relative to other wages.

The adult minimum wage applies to all employees aged 16 or over who are not new entrants or trainees. There is also a new entrants' minimum wage which applies to employees aged 16 and 17, unless they have completed 200 hours (or three months') employment, whichever is the shorter; or they supervise other staff. It does not apply to trainees (see below). There is also a training minimum wage that applies to employees aged 16 and over engaged in recognised industry training involving at least 60 credits a year.

The ECA was replaced in 2000 by the Employment Relations Act (ERA), 2000, introduced by the Labour and Alliance government. Under the Labour government (1999-2008) the minimum wage rose in real terms by 32.9 per cent (Maloney and Pacheco, 2009). Changes were made in 2001 entailing a large rise in the minimum wage for young people, creating an 'ideal opportunity' for a 'natural experiment' (Hyslop and Stillman, 2007) on the effects on the youth labour market.

In 2001, the position on youth minimum wages was changed in two respects.

¹⁴ The exchange rate of the NZ \$ to the £ in August 2010 was \$1 = £0.45 (£1 = \$2.22) (£1 = \$ 2.30 in Aug. 1983).

¹⁵ 'Awards' functioned like extended collective agreements (Freeman, 2006). Chapple (1997) notes that up to 20 per cent of award minima were below the statutory minimum wage in the mid-1980s.

The age of eligibility for the adult minimum wage was lowered to 18 in March 2001; this effectively raised the minimum wage for 18 and 19 year olds by 69 per cent (Hyslop and Stillman, 2007). Subsequent increases to the adult minimum wage of 3.9 per cent in 2002 and 6.3 per cent in 2003 raised the minimum wage for people in this age group by 87 per cent between 2000 and 2003, compared with the 13 per cent for adults on the minimum wage. In absolute terms, the increases were as follows:

Effective date	Adults	18-19 year-olds	16-17 year-olds
6 March 2000	7.55	4.55	4.55
5 March 2001	7.70	7.70	5.40
18 March 2002	8.00	8.00	6.40
24 March 2003	8.50	8.50	6.80

Source: Hyslop and Stillman (2007)

The minimum rate for 16 and 17 year olds was raised in two steps (in March 2001/2) to 80 per cent of the adult rate, raising the minimum rate for this group by 41 per cent over a two-year period. The subsequent 6.3 per cent increase in 2003 raised the rate overall by 49 per cent between 2000 and 2003.¹⁶ Hyslop and Stillman note that ‘these large and focused changes provide an ideal opportunity for studying the effects of minimum wage policy on the youth labour market.’

The statutory minimum wage is the only legal wage floor. The aim is to ‘set a wage floor that balances the protection of the lowest paid with employment impacts’ (Department of Labour, 2009b). The minimum wage is payable to full-time, part-time or casual employees; to home-workers; and to workers paid wholly or partly by commission or on a piece-rate. A range of criteria have been set by the Cabinet for guiding the annual assessment of the minimum wage. These include ‘any (dis)incentive effects for young people to choose low paid employment or additional education and training’ (Department of Employment, 2009).

¹⁶ This rate was then raised to 100 per cent of the adult rate from March 2008, except for new entrants and those on approved training programmes. No research has yet appeared on this change.

Over half of those earning the minimum wage are 18-24 years of age, and a 'high proportion' of those aged 16 and 17 are also 'paid at or near the minimum wage' (Department of Labour, 2009b).

The age dimension for determining status as a minimum wage earner is discussed in Pacheco (2007). She concluded that age was a crucial determining factor, and that the impact of minimum wages on young people had risen substantially between 1998 and 2007. For 16-17 year-olds, the proportion of this age group being paid below the minimum wage rose from 4.67 per cent in 1997 to 18.84 per cent in 2004; and for 18-19 year-olds, from 2.39 per cent to 11.3 per cent.¹⁷ Percentages for older age-groups fell over the same period (from 4.67 per cent to 3.35 per cent for 20-24 year-olds and from 3.17 per cent to 1.99 per cent for 25-26 year-olds. Conversely, the proportion of all sub-minimum wage workers accounted for by individuals aged 16-17 rose from 1.45 per cent in 1997-1999 to 16.02 per cent in the period 2002-2004; and this age group accounted for 12 per cent of all minimum wage workers by 2002-2004, an increase from 0.68 per cent in the period 1997-99.

Compulsory education in New Zealand extends to age 16, and all young people have a right to full-time education until the age of 19. The youth unemployment rate is relatively low at 16.6 per cent (compared to a total unemployment rate of 6.3 per cent) and almost three-quarters of those aged 15 to 19 are in education.

❖ *Income improvement, welfare and productivity*

Hyslop and Stillman (2007), which dealt with the relationship between changes in the minimum wage, hours worked, employment, study rates, and other outcomes, is the only study that considered incomes. Combined wage, hours, and employment changes led to 'measurable increases' in labour earnings and total income of teenagers relative to young adults (captured here as log earnings). The study concluded that there were no spillover effects on the wages of young adult workers. However, as noted below, some of the welfare effect was due to an increase in hours worked by young people (higher labour supply responding to higher wages) that could prejudice educational enrolment.

¹⁷ This is attributed to poorer enforcement.

Only one paper (Hyslop and Stillman) considers welfare effects on young people (there is wider literature in New Zealand on the minimum wage as an anti-poverty measure – this is not considered here). This would seem to imply that welfare (and related) effects should yield to employment effects but is this warranted? For a normative theoretical discussion and model, see Lee and Saez (2010).

McLaughlin (2009), basing his work on an institutional perspective, has argued that productivity gains are possible (in New Zealand) consequent on a minimum wage, provided appropriate institutions exist to facilitate this.¹⁸ McLaughlin proposes legislative support for a 're-institutionalisation' of industry bargaining arrangements to encourage firm strategies away from cost-minimisation approaches towards 'long-run dynamic efficiency'. He details the failures of voluntary efforts at coordination on training, despite considerable government support for the costs of employer-delivered training (low take-up, deadweight effects, etc.).

❖ *Effects on Young Workers' Employment*

Chapple (1997) responded to earlier work using time-series by Maloney (1995), who had found small negative employment elasticity. Chapple's work focused mainly on the impact of minimum wages on young adult workers, and used national time-series data complemented by panel data intended to gauge industry effects (as a proxy for impacts on the lower end of the wage distribution). The period covered was 1980-1997 and the age group was 20-24 year olds (as this study pre-dated some important changes to the minimum wage).

The results were inconclusive: 'it is difficult to isolate a robust significant impact of minimum wages on employment' (Chapple, 1997). Using his preferred regression specification, Chapple proposed a long-run elasticity for this age group of -0.177. However, this over-predicted employment for this age-group: the author conjectured this might be explicable by rising returns to education leading individuals to switch

¹⁸ Higher productivity might raise welfare and the long-run production potential of the economy by facilitating movement to a 'high road' strategy, but this would not necessarily contradict short-term employment stagnation if productivity enabled the same output to be achieved with the same number of workers.

from employment to training: however, there was no independent corroboration of returns to training for the period cited by the study.

When the whole period was broken into two (1980-88 and 1989-1997), there was a small positive but statistically insignificant elasticity for the first period and 'wild variations' in the size and sign of the coefficient in the second. Overall, Chapple was reluctant to draw firm conclusions – in part because the short duration of the time-series made it difficult to identify underlying trends and relationships.

Hyslop and Stillman (2007) looked at the impact of the minimum wage on several outcomes: compliance; employment rates and hours worked; educational enrolment; benefit receipt rates. The method used difference-in-differences to compare employment rates of 16-17 and 18-19 year-olds with 20-25 year-olds; regression was used to establish relationships between the variables. The study found 'little, if any' systematic change in the trends around 2001 for teenagers relative to young adults' (Hyslop and Stillman, 2007), with no evidence of adverse effects on youth employment immediately after the reform. There was some 'some weak evidence of employment loss by 2003' of 2 per cent for 18-19 year olds, and 2-4 per cent for 16-17 year olds. The employment elasticity for 16-17 year olds was -0.1 to -0.2, and -0.04 for 18-19 year olds for 2003 (although there was no differential increase in the minimum wage for young people in that year).

The studies had difficulty with data collection, notably on enrolment. This was also related to the problem of dealing with the flexible boundaries between work (measured by hours), employment status, and education or training status. Time-series were short, but possibly offset by the 'natural experiment' element which allowed difference-in-differences to be used.

On employment, the only statistically significant result on the preferred regression specification was a rise in 2.3 hours for employed 16–17 year olds in 2002. There is no evidence to suggest that employers substituted older workers (20-21) for young workers to a statistically significant degree.

Benefit receipt rates fell from 2000 for 18-19 and 20-25 year olds, but rose slightly for 16-17 year olds in 2000-2002, before falling in 2003. The authors are sceptical about the statistical significance and magnitude of the changes 'which strike us as being simply too large to credibly be attributed solely to the minimum wage' (Hyslop and Stillman, 2007). It is difficult to interpret this proposition, latched onto by Neumark and Wascher (2008), without further research.

Unemployment and inactivity rates fell for 18-19 and 20-25 year olds, but were stable for 16-17 year olds. The 16-17 year old group was affected by the minimum wage change to a greater extent than the 18-19 group, although the increases in the minimum wage were greater for this group. This is attributed to 'better human capital characteristics' of the latter, enabling them to command higher wages.

❖ *Educational enrolment*

Hyslop and Stillman (2007) found evidence of a slight decline in study rates for 16-17 year olds, but stable or slightly rising study rates for 18-19 and 20-25 year olds. Pacheco and Cruickshank (2007) looked at this issue in greater detail. They analysed the relationship between enrolment rates and the real minimum wage for age-groups between 16 and 24 years. Their measure of enrolment looked at enrolment as recorded by an official enrolment survey, rather than the household survey used in other studies. In the event, although probably more accurate, it was not held to have influenced the overall trend recorded.

Control variables used were education spending (log of the lagged value of education spending as percentage of GDP) and a business cycle control (unemployment rate of prime-aged males). The assumption here is that education spending can influence decisions regarding training (spending as proxy for quality of training): this was held to be problematic for New Zealand where spending follows demand, but it was included none the less. The business cycle control is based in the assumption that young people enter training during a recession.

The results were that education spending had a positive impact on enrolment (subject to reservations about the role of education spending in the New Zealand

context). On the preferred specification, the effect was statistically significant at 5 per cent for 18 and 19 year olds: the coefficients are 0.8655 (18 year olds: standard error 0.3626) and 0.6751 (19 year olds: standard error 0.3230).

On the impact of rises in the minimum wage, the 16-19 year group exhibited a discernible fall in enrolment rates when the (real) minimum wage rose. The fall was statistically significant at 1 per cent, and implied a fall of 1.535 per cent in enrolment for a 10 per cent increase in the real minimum wage (Coefficient estimate -0.1535. Standard error 0.0591). There was no statistically significant relationship between rises in the minimum wage and enrolment for 20-24 year-olds.

There was a positive relationship between the introduction of a youth minimum wage in 1994 and enrolment. The coefficient is 0.1116, significant at 1 per cent significance level. The effect was more marked for the 16-19 year-olds, with a statistically significant rise in enrolment in all specifications (between 0.998 per cent and 1.526 per cent). The authors conjecture that the introduction of a minimum wage had differential impacts on teenagers. For example, teenagers with low skills may have prolonged schooling if they found it hard to find employment at the new MW.

There was a strong positive relationship, significant at one per cent, for higher enrolment of 16-17 year-olds in response to higher unemployment of adult males: the coefficient was 0.2844 for 17 year-olds (standard error 0.0790)

Chapple (1997) found no significant association between industry and responsiveness to the minimum wage (intended to test whether the 'bite' in relation to average wages in an industry affected employment). The introduction of the youth minimum wage in 1994 did not appear to have an impact, in contrast to the findings of Pacheco and Cruickshank (2007), who noted two phenomena. Firstly, enrolment rose on the introduction of a youth minimum wage for 16-19 year olds in 1994 (see below under 'Education enrolment'), and secondly, there was a discernible fall in enrolment rates for the 16-19 year-olds when the real minimum wage subsequently rose.

❖ *Compliance*

Hyslop and Stillman found a possible increase in non-compliance by employers (measured by the proportion of teenagers reporting sub-minimum wages). However, part of this was attributed to random measurement errors in reported wages. Official reports noted 'low and stable numbers of minimum wage compliance complaints, and very few breaches' (Hyslop and Stillman, 2007). However, a higher rate of non-compliance is suggested by Pacheco (2007), who found a significant rise in the number of sub-minimum wage workers in these age groups. The proportion of all sub-minimum wage workers accounted for by 16-17 year olds rose from 1.45 per cent in 1997-99 to 16.02 per cent for 2002-2004.

❖ *Conclusions*

The literature indicates the following conclusions. First, there were no or very small effects of the minimum wage on employment for the 20-24 age group. There were varied findings on the impact of rises in the minimum wage on employment for younger age groups, with estimates ranging from 'non-robust', to zero or fairly weak negative effects (Chapple, Hyslop and Stillman). The employment elasticity for 16-17 year-olds in 2003 in Hyslop and Stillman (2007) was -0.1 to -0.2: this is consistent with other literature. There were negative effects on enrolment for 16-19 year-olds when the minimum wage rose. Introducing a minimum wage had varied effects as the age-group is heterogeneous in terms of skills and life trajectory. The 1994 change led to an increase in school enrolment.

The empirical work mainly tests the proposition that a minimum wage should have disemployment effects. Any deviation from this (a positive elasticity or lack of robustness of a coefficient) is referred for explanation to other theories that might modify 'classical' effects (heterogeneity, monopsony, efficiency wages, re-arrangement of reward, returns to education and training, preferences of actors etc). None of these theories are themselves put forward for empirical examination, yet they would appear to be important for policy, and ascertaining actor preferences and perspectives through qualitative work rather crucial. This is particularly the case when using results derived from systems that might differ in a range of ways from the UK.

e. United Kingdom

The National Minimum Wage was introduced into the UK in April 1999. While there had been earlier attempts at minimum wage regulation in the UK through sector-specific Wages Councils, these were finally abolished in 1993 except for the Agricultural Wages Councils and the introduction of the National Minimum Wage followed a period when no statutory minimum had been in place. At the time of its implementation in 1999 there were two main rates – the adult rate from age 22 and a lower rate covering those aged 18 to 21 and those adults aged 22 and over in training in the first six months of a new job, the so-called ‘development rate’. The development rate was abandoned in 2006 for those aged 22 and over. Apprentices under age 19 and those apprentices aged 19 and over who were within the first 12 months of their training, were exempt from the National Minimum Wage (NMW).

In 2004 a new third rate was introduced for those aged 16-17 and in October 2010 the adult age was reduced from age 22 to 21 and a new minimum rate introduced for those employed apprentices exempt from the minimum wage.

Unlike some other countries where minimum wage age rates are fixed proportions of the full adult wage, in the UK the three rates are reviewed separately by the independent Low Pay Commission.

The most recent research for the Low Pay Commission (LPC 2010) shows that the minimum wage has had a major impact upon the earnings of young people. High proportions of young people are paid at the youth and adult minimum rates, and earnings at the lowest decile remain at least level with the minimum wage. Since 1997 the median earnings of young workers have grown at a very similar rate to older workers, meaning that the pay gap between younger and older workers has more or less remained the same (Office of National Statistics - ONS - 2010). The distribution of earnings for young workers (i.e. 16-24), however, tends to be much narrower than for other age groups and indeed has narrowed since 1997 by 19 per cent. The ONS suggests that this narrowing of the distribution among young workers may be due to the introduction of the NMW because young people are more likely to

be earning below the adult NMW than other age groups and hence will have particularly benefited.

Although the size of the UK working age population increased from 35 to 38 million between 1992 and 2008, the proportion of young people aged under 25 has changed relatively little (ONS 2009). The proportion of young people aged 16-17 is 4.1 per cent of the total and the 18-24 group is 15.1 per cent. Nearly half of all young workers are employed in either retail or hospitality, although the retail sector makes less use of youth rates than the hospitality sector. IDS (2009) found that age-related pay was common in the fast food, restaurant and pub sectors at around 80 per cent of employers. There is some evidence that wage for age rates were in decline before the introduction of the NMW but that employers may now be making more use of youth rates in line with the provisions of the NMW. However, practice appears to vary between sectors.

A major concern of the LPC is that the NMW should not provide an incentive for young people to leave education or training. Research for the LPC (De Coulon *et al*, 2010) found that youth participation in education was positively affected by high youth unemployment with young people deciding to delay entering the labour market by participating in education instead. The LPC (2010) notes that participation in education has increased significantly since the start of the recession in 2008. Quarterly LFS data indicated that the proportion of 16-17 year olds and 18-24 year olds in full-time equivalents rose by 4.2 and 2.0 percentage points respectively between the third quarter of 2008 and the third quarter of 2009. This compares with annual increases of around 1 per cent or less before the recession. Participation rates in FTE have been increasing since before the NMW was implemented and research for the LPC (De Coulon *et al*, 2010) found that the decision of young people aged 16-17 to stay on in FTE was unaffected by local wage rates. The research also found that the introduction of the 16-17 Year Old Rate in 2004 appeared to have had no impact upon participation rates. The recession has not led to an increase in the proportion of young people aged 16-17 who are not in education, employment or training (NEETs) but there has been an increase in NEETs aged 18-24.

Analysis of the effect of the NMW on the employment of those below age 21 is complicated by the fact that some 40 per cent of 18-21 year olds are in full-time education (FTE) and of these the majority (55 per cent) are inactive (LPC 2009). However, around 45 per cent of those in FTE are also in employment. In contrast, some 70 per cent of 18-21 year olds not in FTE are employed. Clearly those working while in FTE are of less concern to the LPC than those who are not, because they are in effect primarily engaged in preparing themselves for skilled work at a later date.

Since 2001 the employment rate of 18-21 year olds not in FTE has been in general decline with both inactivity and unemployment increasing sharply between 2004 and 2006. There were some signs of recovery from 2007 but there has been a significant decline in the employment rate of 18-20 year olds since the second quarter of 2008 to 65 per cent (LPC 2010). The unemployment rate of 18-20 year olds has also risen significantly to over 22 per cent (LPC 2010). For those aged 16-17 the situation is even worse. Between May 2008 and November 2009, the unemployment rate of 16-17 year olds rose by 7.7 per cent to 32.9 per cent. The LPC makes clear, however, that the decline in employment of 16-17 year olds started in 1998, well before the advent of the NMW 16-17 wage rate. In fact, before the recession started there was some evidence that employment and unemployment rates for these young people not in FTE had stabilised and that the introduction of the NMW 16-17 age rate had had no observable negative effect.

❖ *Literature*

In terms of research on the effects of the UK NMW wage upon youth employment, there is little published work apart from the studies commissioned by the LPC. Most of the econometric studies of the employment effects have not specifically looked at young people's employment, which is perhaps surprising.

A paper by Stewart (2002) evaluates the impact on employment of the introduction of the NMW in 1999 by using the geographical variation in wages. The results indicate that, although the minimum wage had differential wage-distribution effects across the 140 geographical areas examined, employment growth after its introduction was not

significantly lower in areas of the country with a high proportion of low-wage workers from that in areas with a low proportion of such workers. The paper uses data from the Labour Force Survey, the Annual Business Inquiry and the New Earnings Survey. The estimates of employment effects were broken down by two age groups – all those aged 18 and above and youths only (18-21). The research found the difference-in-differences estimate for those aged 18-21 to be negative but also insignificant. Nuemark and Wascher (2007) have criticised this paper for only looking at a ‘one-year window’ surrounding the introduction of the NMW and suggesting that lagged effects have therefore not been included. A further paper by Stewart (2004a) estimated the employment effects of the introduction of the NMW in April 1999 and subsequent upratings in 2000 and 2001. It used a difference-in-differences estimator based on the position in the wage distribution. The individual-level longitudinal data was taken from matched Labour Force Surveys. For the upratings an adjusted estimator was introduced to allow for the possible differential response to the change in the macro employment trend. The paper provides estimates for four demographic groups – male and female adults (22-59) and youths (18-21). Only for adult women was there a negative, although statistically insignificant, effect on employment. Stewart found no significant adverse effect on employment for either the introduction or the upratings for any of the groups concerned.

The only major study looking specifically at the impact of the transition from the development rate to the adult rate at age 22 is a study by Dickens *et al* (2010) of the impact on employment of the age related increases in the NMW. They used a regression discontinuity approach that compared labour market outcomes for those just a few months above and below age 22 (the old adult rate) to consider the employment outcomes of low-paid individuals and the impact upon unemployment and inactivity. The assumption is that those workers aged a few months above and below the NMW age boundary will have similar attributes and hence the only difference is the NMW rate received. The NMW rate increases by around 20 per cent on reaching 22. This provides an experimental situation whereby those over 22 are receiving the treatment (i.e. are in receipt of the adult rate) and those below 22 (i.e. not in receipt of the adult rate) are the control group. Estimates are reported using both parametric and non-parametric techniques. A number of tests for robustness

and falsification were also undertaken. These test the sensitivity of the results to a model specification and also test for changing labour market outcomes at other age thresholds and in years prior to the introduction of the NMW. The data is taken from the Labour Force Survey from April 1999 to March 2009.

The data shows a positive and statistically significant employment effect at age 22 for low-skilled workers. The estimated effect is that the employment rate increases by about five percentage points at age 22 – from around 55 per cent to 60 per cent. Results for both men and women are both statistically significant (a four percentage point increase for men and a six percentage point increase for women). These findings were robust to a number of checks including changing the functional form of the regression; varying the total age range over which the labour market outcomes are analysed; excluding those aged exactly 22; and allowing the impact on employment to be different in each year. The results were also subject to a number of falsification tests. No significant employment changes could be found at ages 21 or 23 nor could an effect at age 22 in the period prior to the introduction of the NMW be found. The non-parametric data also points to a similar conclusion but the estimated employment effects are even larger.

Both unemployment and inactivity rates fall at age 22 among low-skilled workers. The estimated effects are statistically significant and suggest both fall by around 2.5 percentage points. There are separate effects for men and women – for men there is a fall in unemployment while among women the fall is more in inactivity. While the findings are robust in indicating a fall in unemployment and inactivity, the authors state that ‘it is not entirely clear what mechanism is driving these results’ (Dickens *et al*, 2010). They hypothesise that there is labour supply effect at age 22 – in other words the higher level of the NMW at age 22 makes it worth engaging with the labour market. An alternative explanation may be that employers who wish to employ adult workers chose an arbitrary age at which they consider a worker reaches adulthood. However, parametric regression discontinuity analysis of employment at age 21 in the period before the NMW found no evidence of discontinuity. Any labour demand effect that existed prior to the NMW may not be large enough to show up in the data.

In terms of policy the research found no evidence that increases in the NMW at age 22 adversely affect employment for those aged 21. Indeed, the results show that labour supply may well increase among this group resulting in a higher employment rate.

❖ *Effects on participation in education*

Two studies were conducted for the LPC in 2004 which considered the effect of the introduction of a third level minimum wage for 16-17 year olds. The first of these, by Dickerson and Jones (2004), provided quantitative evidence to inform the Commission's decision on whether to recommend a new lower rate. Using data from the Youth Cohort Study (YCS), a formal model of the decision between education and employment at age 16 was developed and calibrated. Using a range of assumptions regarding the distribution of 'ability', the predicted impact of a minimum wage on education and employment participation was calculated. Using an individual's GCSE attainment as the key indicator of ability, the research predicted that a wage set between £2.50 and £4.00 per hour would have a negligible effect on education participation.

The second report for the Low Pay Commission, by Frayne and Goodman (2004), reviewed the impact of the 16-17 year old rate on employment and education outcomes. Using data from a large sample of 16 to 17 year olds living in relatively deprived urban areas collected for the evaluation of the Education Maintenance Allowance, they estimated that for every one per cent increase in the 16-17 year old age rate would result in a 3.6 per cent decrease in employment hours among the group. They also estimated that an increase in the wage tends to lead to a shift out of school and into the labour market, and also towards combining school and employment. However, the number who would change their behaviour in this way as a result of the NMW was not found to be significant.

Further work on the effect of the NMW on staying-on rates in education was produced for the Low Pay Commission in January 2010. This work, by De Coulon *et al* (2010), used Local Authorities as local labour markets to compare the impact of the introduction of the 16-17 year old rate in October 2004 on staying-on rates. The

research found no evidence of reduced participation rates among youths in low wage areas compared to high wage areas. It also found no evidence that the large increase in the 16-17 NMW rate in 2006 had any impact either. The authors concluded that the decision to stay on for 16 year olds does not appear to be affected by higher wages on offer as a result of the introduction of the 16-17 rate.

❖ *Employers' Views*

A paper by Lucas and Keegan (2007) explores the distinctiveness of young workers aged 16 to 17 in terms of employers' treatment of them. This research used a sub-sample of hospitality businesses in North Wales and was based on a series of semi-structured interviews about firms' pay and employment practices. This included a systematic method to enable managers to provide some justifiable measures of job content and perceptions of the personal attributes of 16 and 17 year old workers compared to older workers. The authors question the presumption that young workers are a distinctive group with reference to contemporary notions of skill and training requirements. Their view is that employers' employment and pay practices 'both reflect and reinforce the presumption of distinctiveness in the workplace for 16-17 year old labour that is almost wholly student-based' (Lucas and Keegan 2007).

❖ *Conclusions*

Despite Neumark and Wascher's comment that the UK literature on the impact of minimum wages on employment is probably the most numerous after the USA, in the case of the impact upon young people the literature is limited. Only a few of the studies of the impact of the NMW on employment have touched on the effects upon young workers and there have been few dedicated studies of the impact on young people's employment. What evidence has emerged appears to challenge the view that young people are particularly affected, although there is some evidence that both the separation of young people from the full adult rate and indeed the level of the rates set for young workers may have led to this absence of effect. There also appears to be little evidence for a negative impact of the NMW upon young people's participation in education.

3.3 COORDINATED MARKET ECONOMIES

f. France

Minimum wage regulation in France has a long history. In 1915 a law was created fixing minimum wages for textile workers and in 1936 covenants were initiated setting minimum wages by region and by qualifications. There were also the ministerial decisions from 1946 onwards (Cahuc *et al*, 2008). In 1950 a law on collective bargaining mandated representatives of the social dialogue (*la Commission supérieure des conventions collectives*) to agree a national minimum wage for all professions. This was the SMIG (*salaire minimum national interprofessionnel garanti*). However the social partners failed to reach an agreement and therefore the government set the SMIG (Cahuc *et al*, 2008). The SMIG was indexed in relation to the family consumption index (*l'indice des 213 articles*). After the social unrest of 1968, the French government decided to boost the SMIG by 35 per cent, and to reform the minimum wage system into the SMIC (*salaire minimum interprofessionnel de croissance*) from 1970 on. Since 2010, the decision on the increase in the SMIC is reached through the advice of a panel of experts.

The adult minimum wage is paid at age 18. Certain categories of young person can be paid a reduced SMIC, provided they have worked in a sector for less than six months. Those aged 16 receive 80 per cent and those aged 17 receive 90 per cent of the adult rate. Minimum wage workers are mostly found in companies with less than 10 employees (28.7 per cent compared to 10.6 per cent for those with more than 10 employees). Most 'smicards' are young female low skilled workers. Employees younger than 25 years old are paid at SMIC level twice as frequently as those older than 25 (Cahuc *et al*, 2008). In 2009 unemployment among 15-24 year olds was 22.4 per cent (OECD 2010) but in France over 90 per cent of those aged 15 to 19 are in education, so youth unemployment largely affects those over age 19.

Although France has probably the most stringent statutory national minimum wage mechanism in the world (Gautié 2008), there is weak enforcement on employers. Unionisation is weak (5 per cent in the private sector), labour inspections are scarce; sanctions when someone refuses work offered are weak compared to other OECD

countries (Askenazy *et al* 2009). The most common way in which the minimum wage level is circumvented is through unpaid overtime (Gautié 2008). The RSA (*Revenu de Solidarité Active*) acts as a guaranteed income increase for those taking up employment. Since June 2009 the RSA has replaced the RMI (*Revenu minimum d'insertion*) but, like the RMI, people under 25 years old without family responsibilities are not entitled to the RSA.

❖ Literature

Research since 1990 regarding the impact of minimum wages on youth employment (15-24 year olds) in France is limited. Bazen and Martin (1991) argue that the conventional Mincer model to estimate employment effects is not an appropriate one, since it assumes that only young people are affected by the minimum wage and that only the SMIC level impacts the income of young workers. Bazen and Martin (1991) suggest that first an assessment of the impact of minimum wage changes on average wages must be made and then a vector calculated for the demand for labour using the average wage, and finally that these two measures should be used to calculate the impact of SMIC changes on employment. The authors re-examine time series data for 1963-1986 (annual earnings net of employees' social security contributions). They find a real wage elasticity of -0.37 for young people, while for adults this is smaller and insignificant. They conclude that while increases in the SMIC's value exert an upward pressure on the real earnings of young workers, findings that increases in labour costs have had a negative impact on youth employment are not very robust: they estimate the elasticity to be between -0.1 and -0.2. Bazen and Martin (1991) advise that if the government wishes to use the SMIC to improve youth employment, it ought to drop the July upratings and simply maintain the automatic indexation. An alternative they suggest is to introduce sub-minimum wage rates for young workers.

Benhayoun (1994) responded to Bazen and Martin with a study updating his 1990 research cited in Bazen and Martin (1991), since the data set for 1974-91 had been revised. Benhayoun uses Mincer equations and concludes that a relationship between minimum wages and youth employment seems to exist but is very fragile and statistically not significant. Contradicting the findings of Bazen and Martin

(1991), Benhayoun (1994) was led to conclude from this lack of robustness that introducing sub-minimum wage rates for young people was not a good idea. An ILO study on minimum wages (Ghellab 1998) concludes that as French studies in the 1990s found much smaller and often insignificant negative impacts of minimum wage increases on youth employment, there might be other factors at play such as recessions or weak economies.

Not included in the ILO survey is the research by Abowd *et al* (1997), on the relation between one's position in the wage distribution and the probability of transition from and to non-employment. Abowd *et al* (1997) use French data to calculate the impact of an increase in minimum wage on the probability of transition to non employment and finds that for 20-24 year olds the elasticity is -1.2 for men and -1.25 for women. They find a considerably stronger elasticity for men aged 25-30, namely -4.8. Comparable US data is used to calculate the impact of a decrease in minimum wages on the probability of a transition from non-employment to employment. They find an elasticity of -4.2 for men aged 20-24 and -4.8 for women (for ages 25-30 that is respectively -5.9 for men and -7.1 for women) in the USA. This leads to two conclusions: firstly that whilst both the French and American young workers experience a significant effect of minimum wages on employment, the French young workers (under 25 years old) do not experience as large an impact of a minimum wage increase as the American workers. Secondly that the p-values of Abowd *et al*'s (1997) findings show this effect is much less significant for French young workers than they are for the US young workers (respectively in the 0.5 and the 0.0001 ranges).

According to Neumark and Wascher (2007), the evidence regarding overall employment effects of the minimum wage upon young workers is mixed. They argue that the combination of labour market institutions in France make it less likely that minimum wages will have detectable disemployment effects upon young workers.

❖ *Conclusion*

While the impact of the SMIC increases on youth employment is the theme we are most concerned with here, closely related to that is what some authors define as

policies that effectively exclude young people from the labour market. Bazen and Martin (1991) have suggested specific SMIC levels for young workers while Benhayoun (1994) counters that idea. Cahuc *et al* (2008) states that the fact that people younger than 25 years old have no right to the RMI effectively excludes them from the labour market. Cahuc *et al* (2008) call for reforms (which were already staged in 2008 with the planning for the RSA) aimed at making social benefits more consistent, easier to understand and beneficial for 18-25 year olds. This latter suggestion was not taken up by the RSA reforms. The RSA is not obtainable by people younger than 25 years old without family responsibilities.

g. Spain

The Salario Minimo Interprofesional (Inter-professional Minimum Wage: SMI) was established by the Spanish government on 17 January 1963. Until then, minimum wages in the Spanish economy depended upon both the type of economic activity (sector) and occupation. The new SMI system established the minimum wage for any worker from any sector of activity and occupation. The universal character of the minimum wage was then ratified within the framework of the new constitutional democratic regime (1975 to date) in 1980. The Spanish minimum wage is set by statute but is determined by the Council of Ministers after consultation with trade unions and employer organisations. The minimum wage is paid in full from age 16, although there is a training rate at 75 per cent of the full rate.

It is estimated that the minimum wage has continuously decreased in relation to the average salary in the Spanish economy since it was established (Gonzalez Guemes and Perez Dominguez, 2002). Despite this fact, minimum earnings observed for the youth labour market have steadily increased during the last decades in relation to the minimum wage for the adult labour market. Hence the traditional distinction between minimum earnings by age groups (between youth and adults) has tended to disappear. Empirical evidence seems to show however that the process of convergence in the different minimum earnings in Spain has entailed the loss (or non-creation) of thousands of jobs. The youth unemployment rate (age 15 to 24) in

2009 was 37.9 per cent. Around 79 per cent of 15 to 19 year olds are in education and 34 per cent of 20 to 24 year olds.

Since 2004, the Spanish government has tried to increase the minimum wage, in such a way that it can recover its purchasing power (which decreased in previous years) while at the same time protecting employment creation. Until the recent economic crisis, the Spanish government pursued a target of raising the minimum wage to €800 per month (on the basis of 14 payments per year) by 2012, that is, in line with the objectives set by the European Social Charter by which the minimum wage should represent 60 per cent of the average salary in the economy.

❖ *Literature*

All of the papers reviewed dealt with the employment effects of the minimum wage upon young people. Neoclassical thinking and the methodologies preferred by it were utilised in all of the papers examined. In one sense this explains the critical view observed in most papers in relation to (concrete or planned) government intervention in the labour market and related regulations. The group of scholars working on the field in Spain is small and homogenous - most studies were led by one or two of these scholars – which gives the impression that studies on this field and their findings are generally the same. Although at least two of the papers reviewed were commissioned by the government, they invariably present a critical neo-classical appraisal of government interventions that attempt to prove the negative effects of minimum wages on employment.

❖ *Effect of young workers' employment*

Dolado *et al* (1996) use panel data to investigate the effects of the minimum wage on six low wage sectors. Using regression of sector-specific changes in employment and employment for 16-19 year olds on changes in the relative minimum wage, cyclical controls and fixed sector effects, they show a positive and statistically significant elasticity of 0.08 for total employment but a negative elasticity for the 16-19 year olds (-0.15). They also found stronger disemployment effects for the young workers in the sectors where the minimum wage has most bite. Dolado *et al* (1996) also refer to another study which looked at the effect of the large rise of 83 per cent

in the minimum wage for 16 year olds in 1990. Using regional data to regress region-specific changes in youth employment between 1990 and 1994, they found that strong evidence that employers substituted 19 year olds for 16 year olds after the large increase for 16-17 year olds. This finding was not reflected in the data for 20-24 year olds which indicates that the results show the change in the minimum wage, rather than changes in demand for labour. The conclusion was that rises in the minimum wage reduced employment for those aged 16-17 years old.

The most rigorous recent work within this classical paradigm nevertheless shows no effect of minimum wages on youth employment (Cebrian *et al*, 2010). Estimations undertaken on the effects of the rise in minimal wage on employment from Economically Active Population Survey (for the 1981-2009 period), showed no significant effect of changes in the Katz Index on youth employment. The authors were particularly concerned however with two specific issues. First, the possibility that a rise of the minimum wage that exceeds the productivity's growth of un-skilled workers may trigger a process of substitution of unskilled for skilled workers - as the relative cost of the latter decreases with the rise of minimum wage. Second, that the effects of a rapid rise of the minimum wage (e.g. from €600 to €800 per month as originally set by the Spanish Government for the period 2008-2012) within a context of economic downturn may further increase the trend to shed employment.

The two papers on Spain examined the regional and seasonal nature of much youth employment (Gonzalez and Guemes, 1997; Blazquez *et al*, 2009). The second study shows that these act as important mediating variables on the effects of the minimum wage over time on youth employment. The authors of this study conclude that, 'there is no definite evidence of any negative effects of minimum wage on youth employment in Spain in the period under study (i.e. 2000-2008)' (Blazquez *et al*, 2009) when existing regional differences, the existence of lags effects and the seasonal variations observed in youth employment are taken into account. While this finding can be interpreted as evidence of the existence of a monopsonistic labour market, they continue, 'it can also be compatible with a perfect competitive structure where a certain dynamic factor and a structural change in labour market coexist together' (original text in English).

❖ Conclusion

Some findings (Blazquez *et al*, 2009) appear very specific to the Spanish situation and are unlikely to provide a reliable guide to policy making in Britain. Overall, however, the body of work on Spain provides no consistent evidence of negative employment effects for young workers. Neither the effect on participation in education nor training effects are considered in any of the reviewed papers.

h. Greece

Over the last thirty years Greece has implemented policies in favour of a welfare state in an attempt to mitigate the problem of wage and income inequality. The minimum wage is not legislated but is determined through collective bargaining. The government intervenes in this process through an arbitration procedure rather than through legislation.¹⁹ The national minimum wage is set by collective bargaining in the National General Collective Labour Agreement (NGCLA), which applies to employees of the private sector as well as to employees in public enterprises and to non-permanent civil servants. Two parties participate in the NGCLA, namely the members of the General Confederation of Greek Workers²⁰ (GCGW) and representatives of the Hellenic Federation of Enterprises (SEV in Greek). The duration of this agreement was one year but the July 2010 agreement is for three years. It constitutes the basis for the contractual agreements set at the industry and sectoral level. Payment rates below those agreed in the NGCLA were considered invalid. In case of a collective dispute, the arbitration process is used to resolve the issue. The arbitration process is gradual, starting with mediation by the Ministry of Labour as an initial attempt to resolve the dispute. If this fails then the next step is to refer the issue to the system of Compulsory Arbitration Courts (See Koutsogeorgopoulou (1994) and Metzitakos and Katsimpas (1971) for further

¹⁹ After Greece's current crisis in public finances and the signing of Memorandum with IMF and EU, the arbitration procedure has been under radical consideration. Up to this moment, there has not been any final decision regarding this issue. Although a new legislation framework was confirmed concerning pension and insurance system in May 2010, the issue of the arbitration procedure has been left open to further discussions and negotiations.

²⁰ The basic instrument of trade unionism in Greece.

information about this process). In July 2010, following the financial crisis, a new agreement decided on a freeze in the minimum wage, with increases in line with Eurozone inflation for each of the following two years. A youth sub-minimum wage was also introduced for the 15-24 year old age group at 84% of the adult rate, which now starts at age 25. Prior to this a single minimum wage had been paid from age 15.

There is little official evidence concerning the number of workers employed at the minimum wage. However, based on figures provided by the Bank of Greece in 1987, about 15-20 per cent of the workforce were then paid the minimum wage (Koutsogeorgopoulou 1994).

Policy implementation for closing the wage inequality gap in Greece has been common, especially after 1981 when Greece had the first socialist government in its history. A central manifesto promise in the Socialist Party manifesto was to introduce minimum wage indexation. Conceptually, this policy is designed to address two issues, first, persistently wide wage differentials and second, the deterioration in purchasing power due to a decline in real wages. This indexation operated in a gradual manner, offering the highest possible compensation to those at the lower salary scale while offering no compensation to those at the upper end of the salary scale. This indexation system, known as ATA (in Greek), proved successful in reducing wage differentials but it caused another serious side effect which was increasing inflationary pressure induced by aggregate demand forces (mainly due to wage increases). The inflationary spiral due to the wage indexation system was the number one problem in the economic policy agenda at that time, forcing the design of a stabilisation program.²¹ A main action of this program was to devalue the drachma by 20 per cent in 1986 in an attempt to generate a downward wage spiral. An additional measure taken was the freezing of earnings during the years 1985-1987.

²¹ This happened in 1985 just after the re-election of the socialist party.

The change in government in 1990²² led to the abolition of the wage indexation system but trade unions maintained their powerful position in the negotiations over collective agreements. Given that the public sector in Greece has been a major employer over the last three decades, wage determination has been massively influenced by the interplay between trade unions and governmental officers.²³ Despite critical developments in the international environment²⁴ that offered Greece opportunities to get rid of chronic rigidity, the Greek public sector maintained its privileged role in the economy.

In Greece the full minimum wage is paid from age 25 but varies depending on the length of employment and marital status. The age at which compulsory education ends is 14.5 years but 87 per cent of those aged 15 to 19 are in education. The youth unemployment rate in 2009 was 25.8 per cent, compared to a total unemployment rate of 9.6 per cent.

❖ *Literature*

A recent paper by Karageorgiou (2004) deals with minimum wage effects on youth employment. Using time series techniques and various model specifications, the study concludes that for youths older than 19 a minimum wage increase has a negative impact on employment while for teenagers the impact of the minimum wage is positive in most of the specifications. More specifically, in the linear specification the estimates for the effect of minimum wages on youth employment lies within - 0.15 and - 0.25. However, the statistical magnitude of this effect is not significant. Regarding the effect of minimum wages on teenage employment the estimated

²² The conservative party came into office after three consecutive elections within a period of a year, still with a marginal parliamentary majority.

²³ It is very difficult to obtain an accurate figure regarding the numbers of employees in the Greek public sector. An unrecorded figure that has been extensively mentioned in the press and thus needs to be treated cautiously is about one million, which means about 30 to 33 per cent of the total labour force is working in the public sector.

²⁴ To name some: the Maastricht treaty in 1992, the adoption of growth and stability as members of EMU, and the use of a common currency. These radical changes offered Greece opportunities to rationalise the spending and the size of the public sector as well as to promote the international expansion of Greek firms.

coefficient lies between - 0.09 and 0.68. The precise sign of the estimated coefficient depends on whether the specification includes a time trend. But as in the case of youth employment all estimated coefficients are statistically insignificant.

The paper, however, does indicate that one effect of the single minimum wage for all ages is that employers tend to substitute less expensive teenage trainee employees for more expensive young adult employees (and more likely skilled).

❖ *Conclusion*

There is little literature from Greece directly addressing the subject of the effect of minimum wages upon the youth labour market. The results of the one paper that covers this issue indicate that, while the employment effect on teenagers was less than those aged 19 and above, this might indicate displacement of older workers by those who could be paid a training wage.

i. Belgium

In Belgium, the minimum wage was not introduced by law but by a collective labour agreement in 1975 (Interprofessional CAO/CCT 21). This is called the GGMMI (*gewaarborgd gemiddeld minimum maandinkomen*) or RMMMIG (*revenu minimum mensuel moyen garanti*), which means 'guaranteed average minimum monthly income'. In 1988, collective agreement CAO/CCT 43 introduced an age differentiation. Workers aged at least 22 with one year's length of service are entitled to the minimum wage. Workers under 21 years old qualify for fixed percentages of the minimum wage of those aged 21 with no work experience: 90 per cent at the age of 20; 88 per cent at 19; 82 per cent at 18; 76 per cent at 17; and 70 per cent at 16.

The GGMMI/RMMMIG is defined as a monthly rate but is based on annual income: in an average month the employer cannot pay less than the minimum and most annual bonuses enter into the calculation. Collective Agreement 43 is valid for all private sector employees nationwide. At the sector level, within the Joint Committees (Commission Paritaire), no lower rate can be negotiated. However, higher rates can be set, taking either the form of an alternative GGMMI/RMMMIG or a lowest wage

rate that serves as a de facto minimum. This practice is relatively common in Belgium.

Data (European Union Statistics on Income and Living Conditions for 2006) show that 18.5 per cent of all employees (16-64 years of age) earn a net wage of two-thirds or lower than the median net wage (Marx *et al*, 2009). For the Flanders region, Marx *et al* (2009) calculated, based on SILC data for 2004, that within the category of 16-24 year old workers, 13.4 per cent worked at the minimum wage, 16.9 per cent at 10 per cent above minimum wage, 22.3 per cent at 20 per cent above, and 27.9 per cent at 30 per cent above minimum wage.

The end of compulsory education is at age 18 and over 90 per cent of 15 to 19 year olds are in education. The unemployment rate for 15-24 year olds is relatively high in Belgium at 21.9 per cent in 2009. The total unemployment rate in 2009 was 8 per cent.

Special benefits are available for school leavers. Youngsters can register when leaving school and receive unemployment benefits after a waiting period of nine months. Until 2000 these benefits were passive, i.e. unconditional on one's willingness to accept a job or active attempts to find work. Since 2000, controls and activation policies have been introduced to make the benefits conditional. This was accompanied by an 'activation discourse' within the context of the 'active welfare state'. In 2004, the federal employment office (RVA) reached agreements with regional agencies for labour counselling and training. Those receiving unemployment benefits are monitored by the federal agency. They receive counselling, and are offered employment and vocational training trajectories by the regional agencies. Sanctions such as losing benefits are applied when job search efforts are deemed insufficient. In the wake of these agreements, dozens of projects have been initiated with the young long term unemployed as a target group, some of these as local as city level. The OECD (2007) regards these reforms as heading in the right direction, but advised Belgian policy makers amongst other things to make the transition from school to work less abrupt, and take further steps in 'activation policy' towards young people who receive unemployment benefit. The report also calls for a further

reduction of labour costs for those at the minimum wage, and to remove some rigidities in employment regulation.

❖ *Literature*

'Active welfare state' policies and their impact on the unemployment trap dominate minimum wage research in Belgium. De Lathouwer's (2000) report, published by the Centre for Social Policy (Centrum Sociaal Beleid, University of Antwerp), interpreted simulations from a previous study by the same organisation (Cantillon *et al*, 1999, commissioned by the Flemish government under the VIONA program) to formulate policy advice. Financial incentives of a number of activation policy measures for the unemployed, according to family type, were calculated based on data from 1997. However, the report does not specify its analysis for each policy measure, because the different policy measures have the same outcome for the worker, which is the focus of this research, and not for the employer on whom the respective policy measures have a different impact. The report's findings are: 1) that unemployment traps exist for single parent families making the transition from unemployment into full time employment; 2) that unemployment traps are a major issue for part-time work, even with the IGU (income guarantee allowance); and 3) that for those in part time work and receiving IGU, there is also a 'low wage trap', i.e. there is a financial disincentive to transfer into full-time work. Thus the report advises policy makers to lower income tax on the lowest wages, reduce employer contributions for the lowest wages, and amend the IGU policy.

Cockx *et al* (2004) use a sample of 15,177 young people between 18-26 years old, receiving their first unemployment benefits in 1998 and who had no work experience since the end of their studies. Sample data were taken from Data Warehouse, a database with data on the professional trajectories of Belgian employees. These data comprise a study of the impact of two activation policy measures: 1) Voordeelbanenplan / Plan Avantage à l'Embauche VBP/PAE12 (subsidised jobs for those who are unemployed for more than 12 months – 75 per cent reduction in employer contributions during the first year, 50 per cent in the second), and 2) IGU/AGR (income guarantee benefit) and its impact on women's chances of finding a job. They calculate the 'hazard rate' of policy measures – the extent to which one

improves one's chances of finding a job by participating in the policy measure – and the duration of the first period of employment. VBP/PAE12 improves chances by 2.5 per cent for men and 3 per cent for women. Exit from employment during the first year is reduced by 37 per cent for men and 24 per cent for women. Exit from employment once the person has run through the whole scheme (two years) is at 60 per cent for men, 14 per cent for women (statistically relevant only for men). However, Cockx *et al* estimate that VBP/PAE12 speeds up entry into a non-subsidized job for 37 per cent of the men and 32 per cent of the women. The analysis for IGU/AGR was limited to women. IGU/AGR increases the chances of finding employment, but to a far lesser extent than VBP/PAE12. This leads Cockx *et al* (2004) to conclude that unemployment among less educated employees can be explained by a lack of demand rather than a lack of financial incentives.

Marx *et al* (2009) investigate the working poor in Flanders. They use Eurostat and SILC survey data to create a representative sample of Belgian households (family types). They then use MISIM (micro simulation – a 'tax-benefit' model) to calculate how many people fiscal and parafiscal policy (work bonus and tax) actually has an impact upon. This report calculates how many people work at the minimum wage, how many at the minimum wage+10 per cent, and how many at minimum wage +20/30 per cent. Introducing such a minimum wage scale leads to more detailed insight into the effects of fiscal policy measures on the working poor. They calculate that a rise in the minimum wage (and MW +10/20/30 per cent) of even 30 per cent would not have a significant impact on poverty reduction, since most of the working poor are working at the bottom of the minimum wage scale and hence gain the least. The report also includes a calculation of the effect of the 'work bonus', a reduction in the employee's social security contribution, which was introduced in 2008. They calculate that those in the middle of the income range gain most and that the reduction thus has little effect on poverty. With regard to the minimum wage, Marx *et al* (2009) conclude that parafiscal measures (work bonus and tax reforms) have differential impacts depending on family type. A rise in the total minimum wage as a standalone measure has little impact on the net income for the working poor, but it could help ease the budgetary burden and wage erosion effect of parafiscal measures. Moreover, Marx *et al* (2009) point to a negotiation risk. If policy is focused only on parafiscal measures for the lowest wages, this could take away the pressure

to negotiate higher minimum wages. In a recent position paper, the Flemish employers' organisation (VOKA 2009) stated that the Belgian minimum wage was too high, citing international literature on the issue. Marx *et al* (2009) argue that high minimum wages are an important element in the policy mix.

A third but small research stream on youth unemployment comes from a qualitative sociological perspective. Van Hemel and Darquenne (2009) – in a study commissioned by the King Baudouin Foundation – documents the experiences and strategies of Belgian 'NEET'-youngsters through interviews with them and focus groups with those who offer counselling. It shows that other aspects (social and psychological) than the financial one (the minimum wage) work as impediments to the transition from school to work. Debts, a lack of clear professional ambition, a bad first experience of the labour market (bad job interviews or no response to letters) lead to low job motivation. Bad experiences in school cause low motivation for vocational training. Lack of child care for very young children and mobility issues set these youngsters back when looking for a job. Sanctions, for example losing unemployment benefits when refusing to participate in an offered trajectory, are perceived as unfair. Van Hemel and Darquenne advise policy makers to allocate more resources to job coaching (continuing into employment), revise sanctions (offer real choices), design a separate category for single parents and young pregnant women with a specific trajectory, and acknowledge short temporary jobs as work experience.

❖ *Conclusion*

The Belgian literature focuses on 'active welfare state' policies and their impact on the unemployment trap, rather than the effect of the minimum wage upon employment for young people. Nevertheless, some results are valuable in drawing attention to social and psychological aspects as well as the level of the minimum wage as impediments to young people making the transition from school to work.

j. Portugal

A monthly minimum wage (*salário mínimo nacional*, SMN, later renamed *retribuição mínima mensal garantida*, RMMG) was introduced in 1974, following the Portuguese revolution. As from 1979, the full rate of the minimum wage was paid to workers age 20 and over: 18-19 year old workers were paid 75 per cent of the minimum wage; 15-17 year olds were paid at 50 per cent of the minimum. Rates were and continue to be revised annually. From 1977, a lower rate was introduced for agriculture and domestic work, but these distinctions were abolished for agriculture in 1991 and for domestic work in 2004. From 1 January 1987, the full minimum wage was payable from the age of 18, except for apprentices who received 80 per cent of the full rate. A rate of 75 per cent of the full minimum wage was paid to 17 year olds; 15-17 year olds received 50 per cent. The rates for those aged 15-17 years rose to 75 per cent of the minimum from 1988.

The decision was primarily political in nature, and envisaged as extending full citizenship rights to individuals aged 18 and over. The nominal rise in the minimum wage for 18-19 year-olds was 49.3 per cent between December 1986 and January 1987, compared with a nominal increase of 12 per cent for workers aged over 20. The real increases were 35.5 per cent and 1.6 per cent respectively. This afforded a 'natural experiment' for research.

As of 2010, the adult minimum wage is €475 a month, an increase of 5.5 per cent over the previous year. Recent increases have been substantial, with a proposal to raise the rate by c. five per cent each year between 2007 and 2011. As in the 1980s, low-wage workers in Portugal are still active in export-oriented manufacturing, and this means that minimum wage rises directly impact international competitiveness, causing recent concern for employers. However, the bite of the minimum wage has declined since the 1980s.

In 2008, the ratio of the minimum wage to mean earnings was 33 per cent, and to median earnings 47 per cent. The OECD average was 37 per cent for mean and 46 per cent for median earnings (OECD, 2010). The workforce coverage is high, with between 260,000-400,000 workers paid at the minimum wage level (depending on uprating and the movement of earnings generally).

Compulsory education ends at age 14 in Portugal but over four-fifths of those aged 15 to 19 are in education. The youth unemployment rate was 20 per cent in 2009 (compared to a total unemployment rate of 10 per cent).

❖ *Literature*

This review looks at two pieces of work that studied different aspects of the impact of the ‘natural experiment’ of the 1980s on young people: one deals with employment responses in terms of numbers employed and hours worked (Pereira, 2003), the other with employment flows and separations (Portugal and Cardoso, 2006).

Pereira (2003) suggests that there has been a negative and lagged impact following the large change that took place in 1987, with a range of elasticity of the minimum wage to employment of - 0.2 to - 0.4. Lower demand for labour for young people was also expressed in a fall in hours worked as well as a relative decline in employment numbers.

The lagged response might suggest that firms do not react immediately to large changes in the MW. This would appear to challenge other research that asserts that, based on typical tenures and business models in low-wage sectors, adjustments are very rapid (Neumark suggests a one-year lag). This may be related to employment protection and job mobility factors in Portugal, and possibly the existence of military service for men: these are not addressed as independent problems in the study. Factors related to the speed of adjustment by companies to changes in the MW might vary as between the US and Western Europe, where employees tend not to be employed ‘at will’, where there are longer notice periods and where statutory employment protection legislation might limit short-run employer prerogatives on dismissal. As such, the lagged response noted by Pereira could have more policy relevance for the UK than US estimations based on rapid adjustment.

Portugal and Cardoso (2006) noted that teenage employment rose during the study period, reflecting the fast pace of overall economic growth. In fact, employment of 17-19 year-olds rose faster than the average for all age groups, but slower than that for 20-23 year olds. (17-19 year-olds up by 4.3 per cent between 1986 and 1987,

compared with 3.3 per cent for all age groups and 6.1 per cent for 20-23 year-olds). The unemployment rate for 17-19 year-olds fell from 20.2 per cent to 11.6 per cent. They note: 'this evidence is hard to reconcile with the view that minimum wage hikes always generate significant employment losses' when looked at in terms of the workforce as a whole'.

In terms of worker flows, the teenage contribution to employment in start-ups fell over the period 1986-1989, and the proportion of teenagers employed in firms that closed rose. Overall, the proportion of teenagers in all hirings remained constant. After the rise in the youth minimum wage, firms reduced the share of teenagers in their newly-hired workforce: the share of teenagers was around four per cent lower in 1988/89 than in 1986. However, the share of teenagers in the total number of employees leaving employers ('separations') also fell: that is, teenagers were not over-represented in this group. The study did not distinguish between resignation and redundancy, but the results suggest that the job attachment of teenagers previously earning sub-minimum wages rose (explaining lower separations), and this also rose more rapidly compared with non-affected workers. Start-ups that began activities after the rise in the minimum wage recruited fewer teenagers than start-ups that began operations before the rise. Teenagers were also over-represented in firms that closed.

The rising rate of employment among young people was 'driven mainly by a decline in job separations', and the paper conjectures that this could be attributable to 'firing costs' and 'sunk hiring costs'. This creates an 'inaction band' or period, during which a firm will not react to changes in factor prices. However, the hiring of teenagers fell, suggesting that where these costs are not present, firms will respond in line with classical predictions.

The study suggests, but does not explore in further detail, the possibility that employment protection arrangements could offer an opportunity for less-skilled young people to shelter in companies for a period, should the rise in the minimum wage threaten their ability to find employment. One implication of this – unstated in the study – may be that educational enrolment might rise for some skilled young

people held back from entering the labour market by less-skilled incumbents, and also for some less-skilled young people who have not yet been hired.

In a further piece of work, that in part builds on Portugal and Cardoso (2006) Cardoso (2009), explores the impact on employees subsequent earnings of exposure to minimum wages as young people. The study is based on a dataset that allows individual workers to be tracked over time. Workers were tracked from 1987 to 2005. Two broad hypotheses are investigated:

- i) in line with human capital theory (Becker, 1964) that minimum wages will reduce employer incentives to train, and that exposed employees would subsequently exhibit a flatter earnings profile;
- ii) in line with Acemoglu and Pischke (1999) that, given a range of labour market frictions, and in particular the scope to extract higher rents from skilled employees, and given incentives by firms to follow a job upgrading strategy through training in the presence of a minimum wage, exposed workers might have a subsequent wage premium or steeper experience-earnings profile.

Two other theoretical mechanisms linking minimum wages to human capital formation are expressly rejected: firstly, that minimum wages might have an impact on schooling: no impact is assumed as the general trend towards an increase in the level of schooling means that younger cohorts (i.e. those more affected by high youth minimum wages) will have higher schooling levels and no causal link can be established between this and the minimum wage; secondly, the 'employment channel' is also rejected as a means of influencing the wage profile of workers exposed to the MW as young people, on the grounds that, specifically for Portugal, Portugal and Cardoso (2006) did not find a detrimental impact on employment.

Cardoso (2009) concludes that, in the light of the absence of employment effects and the bite and spillover effects found within the overall group of young people, employers looked for compensating mechanisms to accommodate the increases in the minimum wage:

- i) 'actual exposure to high youth minimum wages can have a positive impact on longer-term wages', with the increases in future wages of between 5 per cent and 13 per cent, depending on the length of exposure (for data where workers remain with the employer and who have been observed from early in their careers as a more precise means of assessing the impact of firm-specific training). This is consistent with labour market imperfection theories.
- ii) A flatter tenure-earnings profile, the longer the exposure to the MW: this is consistent with human capital models, at first sight (see immediately below).

Cardoso (2009) argues that both results are consistent with Portugal and Cardoso (2006) in that increased job attachment by young workers on minimum wages might raise their productivity through work experience (but not 'explicitly costly training provided by the firm'), and that job attachment of such workers would allow firms to flatten the tenure-earnings profile.²⁵ This, Cardoso argues, could be a simple consequence of higher wages when young, with firms compensating for higher initial wages with slower wage progression.

❖ *Conclusion*

Pereira's research is broadly in line with other findings using these approaches, although Portugal and Cardoso (2006) are very critical of the dataset used. The policy implication might be that a 'minimum wage shock', such as that induced by altering the applicability of rates, not only has a negative effect (albeit not a very large one, given the high bite of the minimum wage in Portugal) but will take some time to work through the system. This might apply in particular in European as opposed to US contexts, as European employment protection legislation arguably generally inhibits rapid headcount adjustment. Although counterposing their work in some ways to Pereira and Neumark & Wascher, the study by Portugal and Cardoso

²⁵ As Cardoso (2009) notes, Card and Krueger (1995:170) discuss the relationship between the minimum wage and shirking in this context.

(2006) broadly supports this position, as the lower rate of separations - however understood - of young workers could be interpreted as a limit on adjustment. However, there are many caveats to this argument, which requires much more contextual and qualitative research on enrolment decisions, structures of education and vocational training and associated incentives (returns to training etc.), and the impact of employment protection.

Finally, Cardoso (2009) argues that tests of models hypothesizing particular types of firm response to minimum wages for young people do not yield unambiguous results, with both wage premiums (consistent with Acemoglu and Pischke) and flatter tenure-earnings profiles (consistent with human capital models). She suggests that a 'more comprehensive model of human capital investment by firms following an increase in the minimum wage may be called for' (Cardoso 2009).

k. The Netherlands

National minimum wage regulations have existed in the Netherlands since World War 2 but the current system dates from 1968. In the post-war period all collective bargaining had to be approved by government under an Exceptional Directive on Industrial Relations, which governed collective bargaining for a longer period of time than anticipated when it was introduced in 1945 (Windmuller *et al*, 1979). It was only after the Foundation of Labour gradually developed into a major institution of social policy, representing employers and trade unions, and the Social Economic Council (SER – *Sociaal Economische Raad*), introduced in 1950 with a consultancy duty regarding legislation by the government, that the famous '*Poldermodel*' came to govern industrial relations and labour market development in the Netherlands. This model of policy making is based on intensive interaction and dialogue between employers, trade unions and independent experts (in the SER), by which the interests of various parties are traded off. Policy regarding low paid work and the minimum wage was shaped accordingly.

In the period of centralised wage setting the level of minimum-wage income was explicitly designed to meet the needs of a full-time, unskilled breadwinner and his

family (SEC 1997). With the increasing involvement of the social partners and their institutions in policy making and wage setting, the initiative for the introduction of a minimum wage came from the social partners, who agreed an economy wide minimum wage – 100 guilders a week – in 1964, still based on the needs of the breadwinner as the earner of a family income. Shortly afterwards, in 1968, a statutory minimum wage was established by law (Salverda *et al*, 2008). The minimum wage (143 guilders and 50 cents) was applicable to anyone aged twenty four years or above. Although the level of this minimum wage was set on the basis of the bread winners' needs, it was the same for every employee, regardless of their position in a household. In 1970 the threshold for entitlement was lowered to age 23.

In 1974 the minimum wage for young workers was introduced with a separate level of pay for each year from the age of 15 onwards. The minimum wage for youths is expressed as a fraction of the adult rate, rising from 30 per cent at age 15 to 85 per cent at age 22. The adult rate applies from age 23.

In the Netherlands young people are obliged to follow some kind of education until the age of 18. From the age of 15 until 18 employment can only be part-time, hence the minimum wage only applies to a maximum of three days a week. Youth minimum wages are defined as fractions of minimum wages for adults, starting at 30 per cent of the adult wage for 15 years olds (Salverda 2008). The Ministry of Social Affairs and Employment presents three arguments for this lower youth minimum wage (SZW, 2010): young workers are less trained and experienced; their needs are less than those of adults; high earnings would make work relatively more attractive compared to education. Youth unemployment in 2009 stood at 7.3 per cent, much lower than most of the other European countries considered in this review. Almost 91 per cent of those aged 15 to 19 are in education as are over half of those aged 20 to 24 (the highest proportion of the European countries considered).

Since the introduction of youth minimum wages the debate around the legitimacy and efficiency of separate minimum wages for youngsters has continued. Trade unions are in favour of lowering the age for the adult minimum wage to 21 or 18, whereas in the political debate some would support the increase of the youth minimum wage to age 27.

Wages – including those of low paid employees - are not set in the first place by the statutory minimum wage, but for a considerable number of employees by the lowest threshold of wages in collective agreements. In the Netherlands, with a coverage rate of about 75 per cent, the wage of most employees is set by collective agreements. The Minister has the right to extend the collective agreement for the sector for which the agreement is negotiated.

❖ *Literature*

Dolado *et al* (1996) indicate that studies of the impact of the minimum wage in the Netherlands are complicated by two factors. First, around three-quarters of the workforce are covered by sectoral collective agreements that also set minimum rates. These are typically higher than the legal minimum with the gap being larger for younger workers. This ‘means that the gap between the youth and adult minimum may not be as large as the legal minimum might suggest’ (Dolado *et al*, 1996). However, as most of the sectoral agreements followed the reduction in the youth minimum in 1981 and 1984 and nominal minimum wages in 1984, the time series and cross-sectional variation in minimum wages was not really affected by the sectoral agreements. Secondly, it should be noted that unemployment benefits are directly linked to the minimum wage, so all changes in the minimum wage are reflected in benefit levels as well. This clearly creates problems in disentangling the effects of benefit changes from minimum wages.

Studies on the impact of the level of minimum wages on employment do not, however, show clear evidence. Van Soest (1989, 1994) and Koning *et al* (1995) claim to find very negative effects of minimum wages, but do so using data in which there is effectively no variation in minimum wages (Dolado *et al*, 1996). Van Soest (1994) analyses the impact of the youth minimum wage on both employment and unemployment of youngsters compared with overall figures for all employees. One of the hypotheses is that employers would employ more (young) employees because of lower labour costs with a low minimum wage. This could mean a growth of employment or substitution of older workers by young employees. The study finds, however, no clear evidence for an impact of lowering of the minimum wage on

employment and unemployment levels. It concludes that it is not clear whether employment has improved or whether substitution effects have taken place.

Dolado *et al* (1996) looked at the change in youth rates relative to adult rates in 1981 and 1983. The fraction of the adult minimum received by 20 year olds was reduced from 77.5 per cent to 61.5 per cent and for 16 year olds from 47.5 per cent to 34.5 per cent. While wages for those aged 23 or more increased by nine per cent from 1980 to 1984, the wage for those aged under 23 actually fell, with the youngest workers having the largest fall. However, in terms of employment the share of youth employment fell from 19.4 per cent in 1979 to 16.4 per cent in 1985.

Dolado *et al* (1996) also consider this effect on the nine occupations where young workers are most commonly found. They found that while the youth share of total employment in the whole economy fell over this period, there was a slight increase for two groups – agricultural labour and leather and textile workers. This might suggest that the cut in youth minimum wages did increase the relative employment of young workers in those parts of the economy most likely to be affected although these differences were at best ‘on the margins of statistical significance’ (Dolado *et al* 1996). Most of the sectors showed a decline in the youth employment share.

The Labour Inspectorate found that an overwhelming majority of companies did not use the new, low, collectively-bargained scales and only 6 per cent of employees had a wage at these levels (Ackerman and Klaassen, 1998 in Salverda 2008). It is therefore fair to state that the effects of the changing nature of the minimum wage on actual jobs and employment levels are likely to be limited.

❖ *Conclusion*

The difficulties in measuring the impact of the minimum wage on employment in the Netherlands, noted above, must be taken strongly into account in assessing the impact of minimum wages. In most low-paying sectors MWs appear to have reduced employment slightly although slight increases in employment were also found in some.

I. Finland

❖ *Context*

Finland, in common with some other countries such as Denmark, is normally described as not having a statutory minimum wage. However, since the 1970s, minimum wages have been based on collective agreements concluded in most sectors between employers' federations and trade unions. These agreements stipulate minimum wages and the coverage of this system has been extensive, since an *erga omnes* or 'extension' arrangement exists in most agreements whereby the agreements are binding on employers in a given sector whether those employers are members of the employers' federation or not. According to Statistics Finland, the level of minimum wages has been about half of the average earnings of employees in each sector. Progressive taxation tends to reduce the differential between minimum and median wages in each sector: at the minimum wage level, taxation is around 12 per cent; at average earnings levels, it is about 18 per cent.

There are employees who are not covered by collective agreements (around 5 per cent) for different reasons. If there is no collective agreement, then industrial inspectors who normally cover safety issues monitor compliance with other arrangements. These are that where the social partners have made recommendations, they are adopted as the basis for fixing a minimum wage. In all cases, even where no such recommendations exist, a full-time employee should be paid at least those wages that would give him or her the right to unemployment insurance. This would currently mean a wage of around €1,000 per month. Thus, there are in fact legally and normatively-sanctioned 'safety net' arrangements that operate to ensure full coverage where collective agreements fail to do so.

The minimum wage has only been an issue in Finland recently to the extent that foreign sub-contractors have on occasions not paid it. This has caused strikes to occur in construction companies and in fact the issue has been a principal cause of strikes in Finland in recent years. Therefore the only contentious issue has been compliance by 'outsiders'.

Youth unemployment in Finland in 2009 stood at 21.6 per cent, compared to a total unemployment rate of 8.4 per cent. Over 90 per cent of those aged 15 to 19 years old are in education as are over half of those aged 20 to 24.

❖ *Literature*

The one available paper on our subject concerning Finland is Böckerman and Uusitalo (2009). This paper looks at youth minimum wages and employment in the retail sector. It follows up on previous work that found no negative employment effects from the minimum wage carried out earlier by Sauramo and Solttila (1985) and Saari (1996). It studies the effects on youth employment of the temporary Finnish policy between 1993 and 1995 of allowing employers to pay workers under 25 below the agreed minimum rates, within the retail sector. It used employers' data. The main findings are that although some employers did take advantage of the possibility of paying below the MW, the majority did not, fearing that this would have a negative effect on effort. There was no employment effect, i.e. the temporary policy did not boost employment among the young worker group that it was intended to benefit. In fact, there was a very small positive employment effect on the group whose wages were not reduced.

❖ *Conclusion*

The small but rigorous literature on Finland provides no support for an argument that employers look to reduce minimum wages when given the opportunity, and that other factors such as motivation and retention are relevant to their decision-making process opportunity.

CHAPTER 4: OVERALL CONCLUSION

Our review was conducted by a sizeable team of specialist reviewers that included country experts external to the review team. Over sixty papers were reviewed, with over a third of these coming from North America. Striking lacunae exist in the current work on the employment effects of minimum wages internationally. For example, there is a clear need for more qualitative work on employer views both of employing young people on the minimum wage and on training young workers, in order to shed more light on the mechanisms at work.

The concerns of academics in the different countries facing the issues discussed here vary considerably. In many CMEs, the issues have had a low or very low public profile. The literature from LMEs appears most useful for UK policy purposes both because of its focus on the issue and because of the institutional similarities. By far the greatest volume of high quality literature on our issues has been generated by US-based academics, although even in that country coverage of the issues is patchy.

The review covers the three main policy concerns relating to the Minimum Wage, viz: 1) that the minimum wage may lead to the displacement of younger by older workers, 2) that the minimum wage may, if set too high, act as a disincentive to young people to invest in their educational opportunities and to enter the labour market instead; and 3) the minimum wage may affect the provision of training for young workers, positively or negatively, either because they become a more expensive resource and hence more valuable or because their costs deter employers from training them.

The size of employment effects from the introduction of a minimum wage, or of increases in existing minimum wages for young people in general are extremely small and on the margins of statistical significance in the great majority of studies surveyed. The employment elasticity for 16-17 year-olds in 2003 in Hyslop and Stillman (2007), in the New Zealand study was -0.1 to -0.2, a typical result for those studies arguing that a significant effect exists. There is some evidence that negative employment effects, where they exist, may disappear as the worker ages. The

disemployment effects of minimum wages remain hotly disputed in many countries, but are in any event very small, and even non-existent, when subjected to sensitive econometric analysis. In some cases, employment is increased by the existence of a minimum wage. Once issues of seasonality, serial correlation and heteroskedasticity are addressed and the longer the time available in the data, the smaller the impact of the minimum wage on employment becomes.

The impact of minimum wages upon the youth labour market is more likely to be negative where there is no separate subminimum (minima) for younger workers as for example in Spain.

There is some evidence that the very small employment impacts can be mitigated and in some cases be positive if the subminimum rate is set at the appropriate level. The prudent approach taken by the UK LPC might be seen as helpful in mitigating the effect of youth minimum wages on employment. There is evidence that increases in 16-17 year old rates do have some negative effect on the extent of their employment, as shown for example in the New Zealand study by Hyslop and Stillman (2007).

Where wide support exists in society for minimum wages, employers rarely take advantage of suspensions of minimum wages for younger workers even when given the opportunity to do so, as shown in the case of Finland where employers did not take advantage of a temporary minimum wage suspension to reduce young workers pay (Böckerman and Uusitalo, 2009).

The method by which the minimum wage is set is relevant, with systems which set rates by collective bargaining less likely to experience negative employment effects. Minimum wages for young people may also have a less negative or indeed nil impact where there are strong labour market interventions by Government to support employment for young workers.

There is only a relatively small literature on effects on schooling. In the UK and the USA, there is very little evidence that minimum wages for 16-17 year olds have exerted a negative influence on continued school participation. The legal school

minimum leaving age is an important determinant of continued participation. Schooling effects appear to be as dependent on school leaving ages and other factors conditioning individual decisions as on minimum wages.

Effects on employer training are less studied than the other topics. There are contradictory estimates of the effect of minimum wages on training, partly because effects are very small.

The overall findings of our review are that the impact of minimum wages upon the youth labour market is more likely to be negative where there is no separate subminimum(s) for younger workers. The effect appears to vary across social groups and not simply across age bands.

The method by which the minimum wage is set also appears to have an effect, with systems which set rates by collective bargaining less likely to experience negative effects. This is partly explained by the fact that, under collective bargaining, outcomes are more likely to be linked to the current state of the labour market, in comparison to systems which have more rigid links to economic indicators. Minimum wages for young people may also have a less negative or indeed non-existent impact where there are strong labour market interventions by Government to support employment for young workers.

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TECHNICAL APPENDIX

By Dr Denise Hawkes

Econometric Techniques for Estimating the Effect of the Minimum Wage on Employment

This literature review has highlighted many econometrics papers that have attempted to quantify the impact of the minimum wage on youth employment and employment of the low paid. Regardless of the method, the aim of the papers was empirically to test the following theoretical model:

$$\text{Employment} = f(\text{Minimum Wage, Other Covariates of Interest})$$

The model has been quantified using three main approaches based on the type of data available: time series, repeated cross sectional data or panel data. The key characteristics of the data that determine the method used to estimate are the primary sampling unit used: aggregate data (regional, national) or individual data and the length of time for which the data is available (2 periods or more). This technical appendix will highlight these three main estimation approaches and briefly discuss their usefulness.

❖ *Aggregate Data – Time Series Estimation*

The use of aggregate data to consider this question will enable the researcher to consider the impact of the minimum wage on the employment rate in the economy over time. Therefore if the focus of the piece of work is on the overall regional/national rate of employment, this data can provide useful insights. It cannot however tell us about the individual decisions of the people within the labour market in relation to the introduction or change in the minimum wage. With aggregate data, time series methods are used to consider the effect of the minimum wage by collecting data before and after the introduction/change in the minimum wage rate. These methods involve estimating the following models:

$$E_t = a + b \text{ MW}_t + c X_t + u_t$$

Where t is the time period in which the variables are observed, E is employment rate, MW is the minimum wage, X is other covariates of interest and u is the error term. This model can also include lagged variables of the independent variables if there is believed to have been a time lag in their impact on the employment rate.

Interestingly it is clear from the review that once issues of seasonality, serial correlation and heteroskedasticity are addressed the longer the time available in the data the smaller the impact of the minimum wage on employment. This approach therefore is useful in seeing the longer term impacts of minimum wage legislation on the labour force as a whole. The weakness of this approach is that it cannot tell us in detail about the types of workers most affected by minimum wage legislation. For that we need to consider individual level data.

❖ *Individual Data – Repeated Cross Section*

The use of repeated cross sectional data enables the researcher to consider the immediate impact of the minimum wage on employment in the economy. Whilst the data collected is often based on individual surveys, the analysis must focus on the average effects on the sample as the same individuals are not necessarily interviewed at both time periods. Like the time series data therefore the focus of the piece of work is on the overall or average effect on the rate of employment. With repeated cross section, a difference-in-differences approach is used to consider the effect of the minimum wage by collecting data before and after the introduction/change in the minimum wage rate. In a two period model across two groups of works, covered by and not covered by the minimum wage, the following model would be estimated:

$$E = a + bMW + cZ + dMW.Z + eX + u$$

Where E is the employment rate, MW is the minimum wage rate, Z is a dummy for covered by the minimum wage and $MW.Z$ is the interaction term between minimum wage and being covered by it, the X is other covariates of interest and u is the error term.

These models are often estimated in the form of a natural experiment where the policy change was introduced in a pilot in the first instance for example. Of course the validity of the model depends on our belief in the separateness of the control and treatment groups. This approach is good for the analysis of the immediate effects of the minimum wage policy if the natural experiment is considered truly exogenous. The weakness of the approach is that it cannot tell us in detail about the individual workers decisions in response to a change in minimum wage legislation. For that we need to consider panel data.

❖ ***Individual Data – Panel Data***

The use of panel data would enable the researcher to track the same workers through time and see how their behaviour or labour market experience changed in response to the change in the minimum wage. It can therefore provide a focused look for the youth employment effect in terms of the movement between employment, education and inactivity. These methods involve estimating the following models:

$$E_{it} = a + b MW_{it} + c X_{it} + u_{it}$$

Where t is the time period in which the variables are observed and i is the individual for which data has been collected, E is employment rate, MW is the minimum wage, X is other covariates of interest and u is the error term.

These models would largely be estimated with fixed effects estimation, although some may use random effects models. The validity of the fixed effects results depends on the assumption that the unobserved characteristics are constant over time within an individual. Any time-varying unobservable has the usual omitted variable bias effect.

In conclusion, the research objective and the type of data available jointly determine whether a short-run or long-run estimate was found and whether the focus was on the labour market as a whole or on the individual workers experience in response to a change in the minimum wage.

APPENDIX: Table 2 Tabular Summary of Results from Key Literature

Country	Study	Aim of Research	Sample Size(s)	Time Period(s)	Employment effects of MW; Elasticities	Training effects of MW	Schooling effects of MW
USA	Acemoglu and Pischke 2001	Academic research. This paper looks at the effect of the minimum wage on training provision.	The NLSY is a panel of youths and oversamples those from disadvantaged backgrounds. It contains a relatively high number of low wage workers directly affected by MW increases. However, the sample period used excludes very young workers. The NLSY is a panel of youths aged 14 to 21 in 1979 but the analysis follow the cohorts from 1987-1992 (so the workers will be 22-27 years old).	1987-1992		No significant effect of MW on training. Workers starting a new job are more likely to receive training.	
USA	Bazen and Marimoutou 2002	Economic research. This paper looks at employment effects of teenage minimum wage.	The data source used is taken from Card and Krueger (1995). This, in turn, was an update of the data used in Wellington (1991) which is taken from the Bureau of Labour Statistics and the Current Population Report.	Different sample lengths are used: 1954:1 – 1979:4 (quarterly data). 1954:1 – 1989:4 1954:1 – 1999:2	Negative impact: when the MW increases by 1% in real terms, the teenage employment rate will fall by 0.1% in the same quarter; but in the long-run the effect increases to 0.2%.		
USA	Chaplin and Turner 2003	The paper intends to extend the evidence on the impact of MW on school enrolment by controlling for ethnic background, urban status and	The data are not very large compared to other source (CPS) but the information on enrolment is more accurate so overall this is a good data set. The	Panel data analysis covering the following period: 1989-1996			Negative effect: a \$1 increase in MW lowers the continuation ratio by approximately 1%. The interaction terms

		different compulsory schooling laws in different states.	specifications include a large number of controls to account for different factors that might affect continuation ratios.				between the MW and the different dropout ages show that the MW has a negative and significant effect in those states where the dropout age is 16 or less.
USA	Currie and Fallick 1996	Academic research. This paper considers the effect of the minimum wage on employment.	Looks at effects of increases in the Federal minimum wage between 1980 and 1981. Large sample of young people followed through time with extensive labour market data.	1979-1987	Negative effect: increasing the federal MW in 1979/1980 reduced youth employment by about 3% a year afterwards. Estimated elasticities - 0.19 to -0.24; significant.		
USA	Farris and Pedace 2004	The paper analysis the impact of MW on job training using an Employer Survey rather than the worker Surveys used in previous work. This allows a better evaluation of the determinants of training, which is ultimately offered by the firm. The paper aims at addressing the issue of poor measurement of on-the-job-training as well as controlling for establishment-level characteristics that can affect training.	The sample size is fairly large (cross section of 1098 observations). The NES provides detailed information about hours of training and percentage of worker training.	The analysis covers one year: 1997		<p>Negative impact of MW on the percentage of workers trained. No significant impact of MW on average hours of training.</p> <p>Effect of MW on average hours of training: Front line: 0.2407 (13.1012) Support staff: - 4.7185 (9.8664) Technical: 8.7051 (14.1721) Supervisory: - 1.4752 (9.3511)</p>	

USA	Neumark and Wascher 2001	Academic research. It aims at re-assessing the relationship between the MW and training using employee data.	This is a cross sectional analysis with some time dimension introduced in the construction of the MW variable (percentage by which the state minimum exceeded the federal minimum over the previous 3 years) and in the use of a control group for the year 1983. The descriptive analysis is very detailed and shows interesting differences among the different age groups.	Cross section analysis for 1991		Impact of MW on on-the-job training: MW reduces the incidence of on-the-job training among 16-24 and 20-24 year olds at the 10% level. Negative effect for the group 16-19 years old but not statistically significant. Impact of MW on training to qualify for the current job: no significant positive effects. Some significant negative effects on the 20-24 years old; positive and significant effect of MW on in school training for the 16-19 age group. They find no incidence of MW on informal training while there is a negative effect of MW on formal training for the 20-24 years old. The effect on the 16-24 years old is not statistically significant.	
USA	Neumark and Wascher 1995	Academic Research. Examines effect on teenagers at Federal	The sample is limited to individuals who were between 16 and 19 in	1979-1992	.		A higher MW increases the demand for

		and State levels.	the first year of the matched records so it is particularly suitable for the analysis. The CPS permits a match of some individuals for the same months across two consecutive years. The records include employment and enrolment status. The former is taken from the employment status recode, while the latter is deduced from the major activity in the survey week. The authors use a multinomial logit model which is suitable to capture changes in the probabilities of different activities, with respect to the MW variable.				enrolled (higher educated) teenagers. Workers leaving school and queuing up for jobs when MW increases.
USA	Neumark and Washer 2003	The publication aims at providing additional evidence on the relationship between schooling and MW. It also intends to address the criticism by Evans and Turner (1995) by using a correctly measured MW variable and to present more up-to-date evidence.	The sample size and the methodology are correct. However, apart from the unemployment rate, there are not many controls for other characteristics of the labour force.	1978-1989 1980-1998 – updated estimates	Positive and significant impact of MW on the proportion of workers employed but not on those enrolled, i.e. it 'sucks' young people out of school.		MW has a significant and negative effect on enrolment rates.
USA	Park and Ratti 1998	Considers the effects of MW on teenage employment.	The issue of non stationarity is certainly important when analysing time series data. The authors carry out unit roots test and	1954:1 – 1992:2	In the regressions the impact of the MW on teenage employment is negative and statistically significant in most specifications and its		

			show that all series but the DV are non stationary in levels. Therefore the methodology used for the estimation (taking first differences of the non-stationary variables) is appropriate. However, the authors should have maybe looked at different dynamic models.		effect ranges from -0.75 to -1.04 (linear model) and from -0.67 to -0.96 (log model). But NB the problem of spurious regression noted in text.		
USA	Schiller 1994	Economic research/policy research. Considers the impact of MW on training.	The analysis is based on a large sample of workers followed over the years 1979-1987. The age of the workers ranges between 14-22 at the beginning of the sample and 22-30 at the end of the sample. The survey contains specific questions on training. The data set is particularly suitable for analysis of MW effects on youths. Methodology is based on Logit (training equation) and standard OLS (wage growth equation).	1979-1987		Analysis suggests a negative effect of MW on training; however, workers on the MW at entry do not perceive themselves to be at a disadvantage. A large majority of young workers do not feel trapped in low wage jobs with low training opportunities; they feel that they are gaining valuable experience, and they have chances for promotion.	
USA	Turner and Demiralp 2001	The paper analyses the joint impact of MW on teenagers' school enrolment and employment. The paper particularly refers to the proposed increase in the	Looks at effect of minimum wage on school enrolment. The main advantage of the survey used is that it attempts to follow teens if they move out of their parents' household.	1991 and 1992	Considers Federal MW increase in 1991. Multinomial logit analysis. Positive impact on idleness: MW hike significantly decreases the probability of becoming idle (not		Negative impact on school enrolment

		federal MW from \$5.15 to \$6.15 per hour and attempts at evaluating the possible outcomes, following this MW hike.	The initial number of youth aged 16 to 19 are interviewed first in 1991 and then again in the following year (17 to 20 years old). Taking into account this time dimension is very important and teens' employment/education status tend to change quite often.		enrolled and not employed). Therefore some positive effects on employment and enrolment.		
USA	Williams and Mills 2001	Economic research. The authors address three specification issues related to time series analysis: 1) Stationarity of the variables 2) Dynamic specification 3) Endogeneity	The authors present a very detailed time series analysis. This is very useful to understand the impact of MW on teenage employment using national data.	1954:1 –1993:4 (quarterly data)	Analyse data from Card and Krueger (1995). Negative effect, highest after 2 years (-4.5%); effects disappear after 4 years. 10% rise in MW brings immediate 0.6% negative effect on employment, 1.6% after one additional quarter; 1.20% after one year.		
Canada	Landon 1997	Academic research. This paper examines the link between the minimum wage and drop-out rates from education.	The sample is robust. Furthermore, the author is at pains to demonstrate that it has been used in a way that makes up for the shortcomings of previous research.	1975-1989			Negative effect: greater the MW, the more likely the drop-out.
Canada	Baker et al 1999	Looks at impact of minimum wage, especially among young workers.	Looks at teenagers (15-19) across Canadian provinces and over time. Tabulations commissioned from Statistics Canada.	1979-1993	Finds negative significant minimum wage elasticity for teenagers of around -0.25. Effect on teenage employment varies across the bandwidth. At low frequencies corresponding to cycles of around six years or more, elasticity is at the upper end of the range identified in previous		

					studies. Elasticities: Within group 0.27, 1st difference 0.07, 2nd difference - 0.13, 3rd difference - 0.31, 4th difference - 0.40. Within-group estimates and longer-difference estimates significant.		
Canada	Campolieti et al 2005a	Analysis of how minimum wages affect various schooling-employment outcomes.	Looks at teenagers across provinces and over time. Multinomial logit analysis. Data from Survey of Labour and Income Dynamics.	1993-1999	Finds that minimum wage increases led to large and statistically significant reductions in the employment of teenagers. Non-employed and enrolled 0.72 Employed and enrolled - 0.57 Employed and not enrolled -1.92 Idle 0.02 Net employment – 2.49 (significant). Net school enrolment 0.15; not significant.		No net effect on school enrolment or on the individual transition probabilities. No substantial substitution of students for non-students or students leaving school to queue for the higher minimum wage jobs.
Canada	Campolieti et al 2005b	Compares transitions from employment to non-employment for individuals affected by minimum wage changes with comparator groups not affected by minimum wages.	Looks at 16-24 year olds across provinces and over time. Data from Survey of Labour and Income Dynamics.	1993-1999	Results indicate that minimum wage increases have increased the transition from employment to non-employment of employed low-wage youths by around 6 percentage points (range 4-8 per cent). Elasticities: - 0.3 to - 0.5.		
Canada	Campolieti et al 2006	Reproduces Neumark (2001) methodology of a pre-specified research design to examine impact of	Looks at 16-19, 20-24 and 16-24 groups, including full-time versus part-time and non-enrolled. Across	1981-1997	Minimum wage elasticities substantial: 16-19 years: – 0.17 to 0.44; 20-24 years: - 0.14 to - 0.43. 16-24 years: -		

		minimum wage.	provinces and over time. Data from April Labour Force Surveys.		0.17 to – 0.44.		
Canada	Yuen 2003	Considers the impact of increases in the minimum wage on youth unemployment.	Looks at 16-19 and 20-24 year olds across provinces and over time. The data is drawn from a relatively short period of time and this may be a limitation (cf. other more longitudinal studies on similar subject matter). However, the stratification of the sample into 'transitory' and 'permanent' low wage workers is useful and innovative in understanding the behaviour of the labour market in question.	1988-1990, annual	Negative effect: an increase in the MW is very likely to lead to a reduction in the overall youth employment level. Permanent low-wage 16-19 workers - 0.86 (significant). Permanent low-wage young adult 20-24 workers – 1.15 (significant). Transitory teens and young adult workers insignificant effect.		
Canada	Edagbami 2006	Considers the effect of MW upon teenage and youth unemployment.	Meta analysis of various studies looking at impact of minimum wage not just of youths and teenagers but more general effects.	Concentrates on studies produced from the mid-1980s to 2006. Meta analysis of studies using varying approaches, although considers primarily studies that have used labour force panel data	MW is generally harmful to teenage and youth unemployment. Elasticities vary according to study under review and are considered in comparison in the meta analysis		
Canada	McDonald and Myatt 2004	Considers impact of MW on youth employment.	Looks at 'teenagers'; longitudinal study using labour force panel data	Mid-1970s- 2004 Annual labour force panel data by province.	Negative effect. Elasticities = -0.259 (1976-1993) but increasing to -0.326 when considered over a longer time period (1976-2002)		

Canada	Swidinsky 1980	Considers impact of MW on employment of females and young people.	Uses annual labour force panel data, considers different aspects of the labour market but draws specific conclusions on effects on 'youth' labour market (as well as women).	1956-1975, Annual labour force panel data by province	Female employment is far more sensitive to MW changes than male employment; for youths the tendency is reversed.		
Australia	Leigh 2003	The aim of the study is academic research with a policy impact, in particular to develop 'indigenous' regression estimates and elasticities for Australia.	Direct data on MW coverage and microdata on employment were not available, so a number of adjustments to the data had to be undertaken to produce FTEs, and to obtain figures for coverage.	1994-2001	Negative elasticity of labour demand with respect to changes in the MW for workers affected by the MW in West Australia of - 0.29, at 1% significance; Elasticity of demand was - 0.39 for younger workers.		
Australia	Mangan and Johnston 1999	Considers effect of state minimum wage levels upon employment of young people.	State minimum differences over time and cross sectionally. The estimates appear to be appropriate, but the data set used in Model 2 was seen as potentially problematic by the authors themselves in terms of self-reporting of employment status.	1980-1994/5	Estimated elasticities were all small and negative, aside from the elasticity for male FT employment, which was small and positive. Derived elasticities were - 0.06 for FT employment, and - 0.04 for PT. For FT employment, small negative elasticities for all groups and for Australia and Queensland: For Queensland, the partial elasticity for FT employment was - 0.27 (15-19 year-olds) and - 0.28 (15-17 year-olds). For PT employment the only statistically significant result was - 0.07 for 15-17 year-olds.		

					For Australia, the elasticity for FT employment was - 0.17 (15-19 year-olds) and - 0.05 (15-17 year-olds). For PT employment the only statistically significant result was - 0.21 for 15-17 year-olds.		
Australia	Junankar et al 2000	To critique prior work that aimed to generate wage elasticities for young workers, and to attempt their own estimates for Australia.	Full data sources are indicated in an Appendix not available with the article. Implication in the paper is that all individuals in the selected occupational categories & industries were covered (average hours x all persons).	1987-1997	38 equations run: on preferred specification, two elasticities deemed to have the appropriate sign and were statistically significant: for f/t 18 year-old males in manuf. -3.1; for f/t females in retail - 2.05.		
New Zealand	Chapple 1997	Considers impact of MW upon employment for those aged 20-24.	Looks at workers aged between 20 and 24. The author notes the problem with using a short-time series, and the problems this poses for obtaining robust results. The unit chosen for the dependent variable was 'employment' rather than 'hours worked': the latter would have been preferable as a measure of labour supply and demand, but HLFS contains a high level of proxy	Time-series data for 1980-1997, for 20-24 year-olds	No 'robust significant impact of MWs on employment' (Chapple, 1997:26). The range of long-run elasticities is - 0.177 to - 0.342, with the lowest in the preferred regression specification. On this basis 'the hypothesis that the long-run impact of MWs on youth employment is zero cannot be rejected' (Chapple, 1997: 35).		

			reporting for the 20-24 age group, with hours reported likely to be less accurate than employment status.				
New Zealand	Pacheco 2007	The aim of the study is to determine which individuals earn the minimum wage or below it, in the light of the increases in the minimum wage and higher 'bite' than in some other countries – and notably the US.	The HFLS is an appropriate survey as it is sufficiently large to capture minimum wage recipients, the incidence of which is relatively low.	1997-2004. The period was broken down into two phases to observe changes in the demographic incidence of the MW: t-tests were conducted to establish whether the characteristics of affected workers were significantly different over the two periods.	Age appears to be a critical determinant of whether any individual is receiving the MW. The increase of MW leads to an apparent fall in the proportion of affected workers with no qualifications. The proportion of MW recipients working full-time fell for both groups. The groups are those earning above and below the minimum wage (from 60-56% to 44-49%), with a fall in hours from 32-29 to 26 hours (for both groups).		
New Zealand	Pacheco and Cruickshank 2007	Economics research. The paper analyses the effects of minimum wages on educational enrolments of 16-24 year-olds in New Zealand for the period 1986-2004. The sample is sub-divided into 9 yearly cohorts in order to analyse age-specific effects.	This data used would appear to address the weakness of the HLFS data used in Hyslop and Stillman: Pacheco and Cruickshank acknowledge that their method yields only yield 'apparent' enrolment rates, as the method can lead to double-counting where individuals are enrolled in more than one institution. An original sample survey might have dealt with the problem by estimating	Time series data for 1986-2004			Higher MWs have a 'negative but insignificant effect' on enrolment rates of 16-24 year-olds as a whole (the elasticity of enrolment with respect to the MW is - 0.0909 (10% increase in the MW will lead to a 0.909% fall in the number of individuals enrolled in education).

			<p>double-counting. The authors note, however, that the issue is likely to be consistent across all age groups.</p> <p>Three regression models are used:</p> <ol style="list-style-type: none"> 1) Linear model (S1) 2) Model including age-specific trends in enrolment rates (S2) 3) Model incorporating labour market conditions on enrolment decisions, to take account of differential impact of the business cycle on different age groups, and associated enrolment decisions. <p>S3 was generally preferred for the analysis and the coefficients cited below are taken from this specification.</p>				
New Zealand	Hyslop and Stillman 2007	<p>Policy research. In view of the fact that a large proportion of 16 and 17 year-olds are paid at or near the minimum wage, and that half of all minimum wage recipients are between 18 and 24, there is a large policy interest in the impact of changes on a) employment levels b) school enrolments.</p>	<p>Looks at introduction of higher minimums for 16-17 year olds and 18-19 year olds. New Zealand HLFS is based on a representative sample of c. 15,000 households and 30,000 individuals: statutory obligation to respond. The sample frame is based on an eight-quarter rotating panel, with one-eighth of households rotating out each quarter. Survey collects data on labour</p>	<p>The research covered the period 1997-2003, based on data from the New Zealand Household Labour Force Survey.</p>	<p>No immediate evidence of adverse effects on youth employment. Employment elasticities in relation to their specified changes in MW for 2003 are -0.1 to - 0.2 for 16-17 year olds; and - 0.04 for 18-19 year-olds.</p> <p>But they also enter a caveat about the negative elasticity finding and suggest that there is weak evidence for employment loss in the longer term.</p>		

			force status, hours worked, educational status plus demographic information. Data on incomes is collected by supplementary questionnaire, the New Zealand Income Survey (HLFS-IS), with data collected annually each June. Samples used from HLFS and HLLS-IS were not matched for individuals but separate extracts.				
UK	Stewart 2002	Evaluates the impact on employment of the minimum wage introduction.	All workers and various skill groups. Looks at the effect of the introduction of the minimum wage in 1999 across geographic areas. Includes youths 18-21 in analysis. Uses difference in difference methodology.	1998-2000 Data taken from New Earnings Survey 1998 and 2000; Labour Force Survey geographic area data; and Annual Business Inquiry 1998-1999.	For youths only (18-21) impact estimate insignificantly different from zero, positive without area effects, negative with them. No lagged effects. Does not distinguish young workers from others in many of the estimates.		
UK	Stewart 2004a	Estimates the impact of the minimum wage on employment probabilities of low wage workers.	Uses individual-level longitudinal data from matched surveys to compare the impact upon male and female adults and male and female young workers (18-21). Difference in difference methodology.	1998-2000. Data from Labour Force Survey, New Earnings Survey and British Household Panel Survey.	Finds impact to be insignificantly different from zero for all four demographic groups and all three datasets. Finding is robust to an extensive range of checks. Estimated effect found to be positive (although insignificant) for both both male groups and for young women in all cases. The estimated effect on adult women is negative in the LFS and		

					NES data but positive using the BHPS.		
UK	Stewart 2004b	Estimates impact of introduction of the minimum wage in 1999 and subsequent upratings in 2000 and 2001.	Adult men and women 22 and over; young men and women 18-21. Variation across workers at different points in the wage distribution. Uses difference in difference methodology.	1994-2000. Data from New Earnings Survey 1994-2000; LFS March 1997-March 2000; British Household Survey. Autumn 1994 – 1999.	No significant adverse effect on employment for any of the demographic groups examined. Elasticities more likely positive than negative but often insignificant. Introduction: Young men 0.15 to 0.51. Young women 0.79 to 1.15. Upratings: Youths 0.07 to 1.09 No lagged effects.		
UK	Dickens et al 1999	Considers the economic effects of minimum wages through experience of wages councils between 1975 and 1992. Presents a theory of monopsony to explain findings.	Uses New Earnings Survey data for Wages Council employees – unfortunately those under age 21 excluded from WC orders from 1986 but adult rates continued to exert an effect on youth employment, so employment figures include young workers in the employment data for the whole period. For the wage variable the basic hourly wage is used. They use the ratio of the minimum to the average wage as the measure of impact of the wages councils upon the wage distribution (so called 'toughness').	1975 - 1992	Minimum wages significantly compress the distribution of earnings but do not have a negative effect on employment. MW effects are positive (and significant) below levels of .55 and insignificant thereafter.		
UK	Dickens et al 2010	The research for the Low Pay Commission examines the impact	The LFS contains just over a thousand 21 year olds each quarter	LFS records are pooled over the period since the	Positive and statistically significant employment effect at age 22 for low		

		of the labour market outcomes of young people. Using the fact that those aged below 22 receive a different level of minimum wage, LFS data is used to examine changing labour market outcomes as individuals turn 22. The focus is on low-skilled individuals but it also examines the impact on unemployment and inactivity.	and a similar number of 22 year olds. The sample excludes full-time students. It is composed of low skilled workers - defined as those whose highest qualifications are equivalent to GCSEs and those without qualifications.	NMW was introduced – April 1999 to March 2009.	skilled workers.		
France & USA	Abowd et al 1997	Compares experience of France and USA in terms of effect of MW on employment.	Both for France and the US identifiers were used to follow individuals from year to year, creating matched files (using INSEE research files for France and Census Bureau matching algorithm for US). Control variables consisted of education, potential labour force experience, race, marital status, region, and date of labour force entry.	1981-1989 for France, 1981-1987 for US	French elasticities: men 20-24: -1.2017 (p-value 0.3451), women 20-24: -1.2485 (p-value 0.1383) US elasticities: men 20-24: -4.2095 (p-value 0.0001), women 20-24: -4.8644 (p-value 0.0001)		
France	Bazen and Martin 1991	It argues that the conventional Mincer equation model to estimate employment effects is not an appropriate one. An alternative model based on the theory	Annual labour force survey (Enquête sur l'emploi) from INSEE (French national statistical agency).	Time series data 1963-1986	Increases in the real value of the SMIC exert significant upward pressure on real youth earnings. Employment elasticity is between -0.1 and -0.23 for youths. For adults		

		of labour demand is developed and used.			elasticity is small and insignificant. Real wage elasticity for young people (15-24) is 0.37.		
France	Benhayoun 1994	Considers effect of MW on young people's employment	INSEE data source.	1974-1991	A relation between the MW and young persons' employment seems to exist but is very fragile (statistically not significant). This lack of robustness leads the author to conclude that introducing sub-MW rates for young people is not a good idea.		
Spain	Cebrian et al 2010	The aim of the paper is to estimate the effects of the rise in the minimum wage on employment.	The study draws up different data sets which seem to be the most comprehensive sources of information available in Spain. All of these data sets are incorporated in the analysis through different means.	The paper covers two different time series: 1) Estimation of the effects of the rise in minimum wage on employment based on Encuesta de Coyuntural Laboral (ECL) covers the period 2000-2008 2) Estimation of the effects of the rise in minimum wage on employment based on aggregated data from Encuesta de Poblacion Activa (EPA) covers the period 1981-2009.	A small negative effect on Kaitz Index (KI) and the level of employment in Spanish firms and a null effect on the employment rate, even in the case of teenagers.		
Spain	Dolado et al 1996	Considers impact of disproportionate increases in the MW on employment of young workers aged 16-19.	Looks at variation on effects of minimum wage across industries where minimum wage most applied. Looks at the effect of the differential increase for 16 year olds compared	Young workers aged 16-19. Data from Contabilidad Nacional Sectorial	Analyses large increases for 16 year olds and more modest increase for 17 year olds in 1990. Negative relationship between change in teenage employment rate and share initially low-		

			to 17 year olds in 1990.		paid but not for 20-24 year olds.		
Spain	Gonzalez Guemes 1997	Academic research.	The study is primarily based on Encuesta de Población Activa (EPA) [Economically Active Population Survey] which is the most comprehensive source of statistical information on employment available in Spain. It is not clear what the sample size is other than the fact that 8 non-agricultural economic activities were included in the study.	The econometric analysis conducted covered two different time periods: 1976-1995 and 1981-1992. The reason for choosing these two time periods is that there were several methodological variations in the Encuesta de Población Activa (EPA) (Economically Active Population Survey) which made estimations very difficult.	A rise in the MW has a negative effect on employment particularly on the employment of teenagers (16-19).		
Spain	Perez Dominguez et al 2002	Academic research. Its central aim is to 'consider the explicit possibility' that changes on the interprofessional minimum wage (SIM) may simultaneously affect the three key aspects of the adolescent labour market: employment, level of activity and unemployment rate.	The study is based on data generated by two of the most comprehensive sources of statistical information available in Spain: 1) Encuesta de Población Activa (EPA) (Economically Active Population Survey), to analyse variables of teenager employment, activity and unemployment rate; and 2) Encuesta de Salarios en la Industria y los Servicios (Manufacturing and Service Industries Wage Survey) to analyse wages.	Data utilised to make the estimations covered from 1981 (fifth trimester) to 1999 (fourth trimester included).	The effect of a rise in the MW on teenagers' employment is negative and significant; a rise in the MW would reduce teenager participation in the labour market and would generate a global increase in the teenager unemployment rate.		

Spain	Gonzalez Guemes and Perez Dominguez 2002	This is a short review paper which compares some key trends relating the minimum wages observed in Spain and other OECD countries in Europe, and the US. These trends and indicators include: general characteristics of minimum wage regulations, Kaitz Index and elasticity of employment on different age groups following changes in minimum wages.	The study is based on analysis of both primary and secondary sources which are very well known and widely quoted in the Spanish context.	Data utilised to make the estimations on evolution of the Inter-professional minimum wage covered from 1963 to 1997. Data utilised to make the estimations on the process of convergence of SIM by age groups observed in Spain covered from 1977 to 1998. Comparison of the Kaitz Index for different OECD countries focused on the period 1992-1995 – presumably the year taken for each country (e.g. 1995 for Spain) depended upon the availability of information on the KI for the country in question.	Wage regulations, specifically those on the MW, could have negative effects on the employment of individuals who commonly work on MW arrangements, notably teenagers.		
Spain	Blazquez et al 2009	Academic publication. The paper aims to examine the effect of the minimum wage on youth employment in Spain. It takes into account both existing regional differences and the dynamic behaviour of employment.	The study is based on up to date and comprehensive sources of statistical information on employment available in Spain.	The paper mainly covers the 2000-2008 period, although the evolution of minimum wages (by age group and amount) is analysed from 1990 to 2008	The MW has a positive and significant effect on youth employment; however, this effect is no longer clear once the quarterly lag is included into the estimates.		

Greece	Karageorgiou 2004	Academic research motivated by the influence of minimum wages on teenage and youth employment in Greece.	Looks at variation between 15-19 year olds and 20-24 year olds relative to average adult wages. Uses Greek Labour Force Survey, Government Statistical Yearbook and UN data plus OECD data.	OECD data 1974-2001 for young adults; 1981-2000 for teenagers.	Elasticities: 15-19 0.22 to 0.63 (larger estimates significant) 20-24 0.22-0.63 (insignificant).		
Portugal	Pereira 2003	Considers company decisions in light of MW to employ young people	The study uses a natural experiment to look at company decisions on which age groups to employ, by looking at the relative employment levels of the three age groups, assuming initially that in the absence of a MW wage effect, all three groups would experience a similar movement in employment. In addition, the study looks at possible substitution of workers in the 20-25 group for those in the 18-19 group, on usual human capital assumptions, with the 30-35 group as a reference.	The study uses panel data for the period 1985-1989, using waves with data collected in March each year: the data mainly covers the period 1986-88, and was designed to exclude anticipated adjustments by companies before the change on 1 January 1987.	Employment/MW Elasticity is - 0.2 to - 0.4.		
Portugal	Portugal and Cardoso 2006	Academic research with policy relevance. Looks at the effect of MW on employment of young people.	The period chosen puts the paper in the 'natural experiment' paradigm. The data source is good quality, and inspection of wage distribution suggests high compliance with the minimum wage,	1986-1989	Main effect is in the relationship between the change in the MW and the share of teenagers in the flow or hiring and separations. Rising rate of employment by young people was 'driven mainly by a decline in job		

			meaning that the MW increase is applied to the full sample and that any net employment effects are not the result of non-compliance.		separations' (ibid. 1008), possibly attributable to 'firing costs' and 'sunk hiring costs' (ibid.) Postulate of an 'inaction band' or period, during which a firm will not react to changes in factor prices. However, the hiring of teenagers fell, suggesting that where these costs are not present, firms will respond in line with classical predictions.		
Portugal	Cardoso 2009	Academic research with policy relevance. Tests relationship between exposure to MW in youth and subsequent pay level and rate of growth, in part as proxy for training & experience.	Administrative longitudinal data on all workers and their firms gathered annually by the Employment Ministry Data covers age, gender, schooling, occupation, seniority, earnings and hours of work. Individuals can be tracked via an identification code.	1987-2005. Workers aged 14-20 as of March 1987 were tracked for the whole period (up until age 32-38).	Relation of MW exposure and tenure to pay. For workers in the same firm, there is a 5% wage premium after 1 year's exposure, rising to 13% for exposure of 5 years. Tenure has a strongly positive effect on the steepness of earnings' rises for tenure up to 13 years: coefficients for returns to tenure from +0.031 at 1 year to max. +0.196 at 13 years, then declining but positive).	Exposure to youth minimum wages can have a positive impact on longer-term wages in terms of a wage premium, but appears to be correlated with lower earnings growth (less steep tenure profile). Implies that firms might offer less formal firm-specific training to MW workers, but that general skills increase through job upgrading.	
Netherlands	Dolado et al 1996		Looks at the effects of fall in youth sub-minimums relative to adult minimum in 1981 and 1983. Covers young workers 17-22	Labour Market Survey 1979-1985	No elasticities provided. Positive effect. Youth employment improved or fell by less over the period in occupations with most young, unskilled workers, relative to overall		

					changes in youth employment.		
Netherlands	Van Soest 1994	The main purpose of the paper was to check whether the decrease of the minimum wage would have had effects on employment and unemployment of youngsters.	Looks at reduction in youth sub-minimum. The data are mainly gathered by the Central Bureau of Statistics (CBS). The size of the data is broad: means for whole population of employees, where youngsters are compared with. This broad approach has a downside as the policy and decisions – considerations - to employ employees is not looked at.	1972-1992. Specific micro-evidence is analysed for the period 1984-1987.	Finds no clear evidence for an impact of lowering of the MW on employment and unemployment levels. It concludes that it is not clear whether employment has improved or whether substitution effects have taken place. Reference is made to an unpublished, mimeo Dutch study by De Koning and Gedderbloom published in Dutch by the OSA in 1990 where it was shown that after wages were reduced, more long-term unemployed were hired – although with government subsidies. Overall, the reduction of the MW seemed, however, not to stimulate the creation of more jobs.		
Finland	Böckerman and Uusitalo 2009	Research Academic. Considers the effect of MW on employment of young people.	Employers' payroll data used. Employment, pay within two groups: those under 25 who could be paid below MW and those slightly older who could not.	1993-1995	There was no employment effect, i.e. the temporary policy of suspending the MW did not boost employment among the young worker group that it was intended to benefit. In fact, there was a very small positive employment effect on the group whose wages were not reduced.		